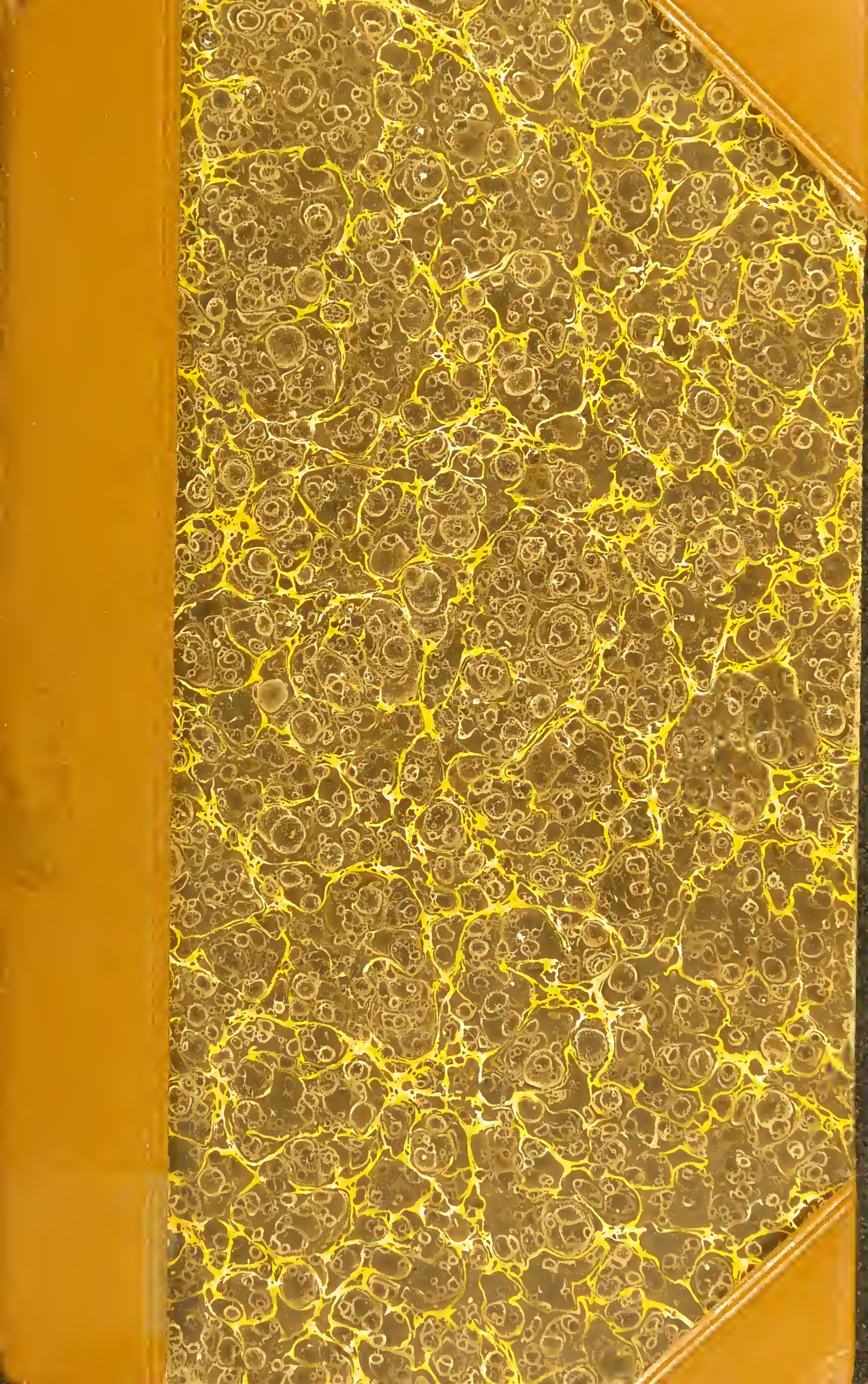

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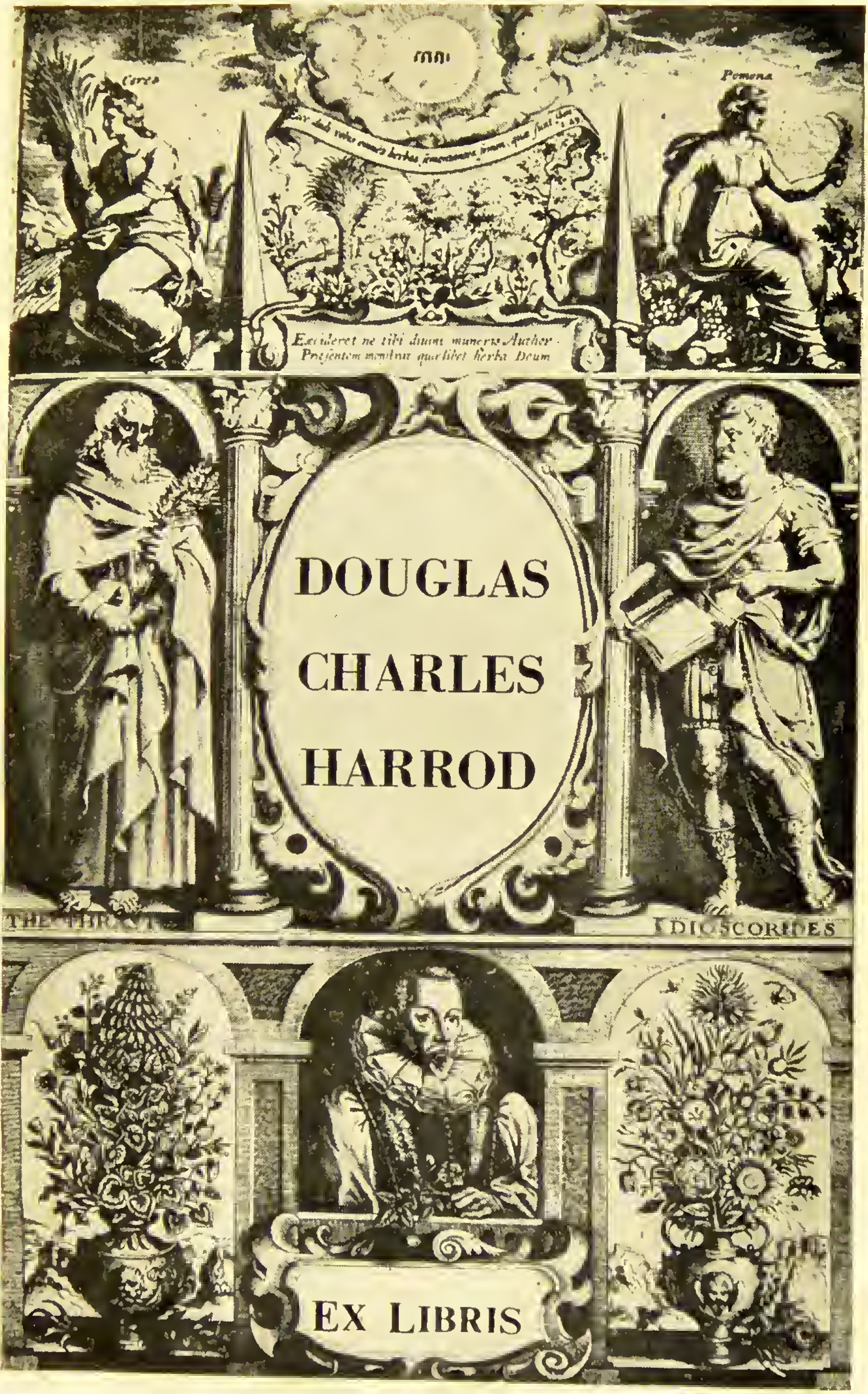
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# OF
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# SYSTEM

OF

# MATERIA MEDICA

AND

# PHARMACY:

INCLUDING TRANSLATIONS OF THE

EDINBURGH, LONDON, AND DUBLIN PHARMACOPŒIAS.

IN TWO VOLUMES.

BY

JOHN MURRAY, F. R. S. E.

LECTURER ON CHEMISTRY, AND ON MATERIA MEDICA AND PHARMACY,
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# CONTENTS OF VOLUME SECOND.

PAGE.

Chap. I. *Preparations of some Simple Substances*....4
—— II. *Conserves*....16
—— III. *Juices*....18
—— IV. *Inspissated Juices*....20
—— V. *Fixed Oils*....26
—— VI. *Emulsions and Mixtures*....28
—— VII. *Infusions*....35
—— VIII. *Mucilages*....47
—— IX. *Decoctions*....49
—— X. *Syrups and Honeys*....64
—— XI. *Wines*....79
—— XII. *Vinegars*....85
—— XIII. *Tinctures*....88
—— XIV. *Extracts*....119
—— XV. *Distilled Waters*....134
—— XVI. *Distilled Spirits*....140
—— XVII. *Volatile Oils*....146
—— XVIII. *Oily Preparations*....156
—— XIX. *Saline Preparations*....158
—— XX. *Metallic Preparations*....255
—— XXI. *Powders*....359
—— XXII. *Electuaries*....368
—— XXIII. *Pills*....375
—— XXIV. *Troches*....385
—— XXV. *Ointments*....388
—— XXVI. *Plasters and Cataplasms*....408

## APPENDIX.

PAGE.

*Of Mineral Waters*..........420
— *the Gases as remedies*..........441
— *Electricity*..........454
— *Galvanism*..........456
— *Medical Prescriptions*..........459
*Table of Doses of Medicines*..........465
*Tables of the proportions of Opium, Antimony, Quicksilver, &c. in certain compound medicines*..........469
*Table of Changed Names*..........471
*English Index*..........481
*Latin Index*..........487

# PART III.

## OF PHARMACY.

THE objects of Pharmacy are the Preservation, Preparation, and Composition of Medicines. In the state in which they are afforded by nature, they are not always best adapted to the treatment of disease: they are often liable to change from spontaneous decompositions, which require therefore to be counteracted: their powers sometimes reside, not in the entire matter of which they consist, but in principles capable of being extracted, and which are employed with advantage in an insulated state, or under peculiar forms; by chemical combinations, remedies altogether new are obtained; and, lastly, medicines frequently require to be combined to fulfil particular indications, or they are rendered less ungrateful, more safe, and even more active, when given in a state of mixture. Pharmacy, regarded as an art, prescribes the rules by which the operations for the attainment of these objects are conducted, and as a science unfolds the principles on which they depend.

The Preservation of Medicines is, generally speaking, the least important part of Pharmacy. Those which are most liable to decomposition are the vegetable products, many of which, especially when the re-action of their elements is favoured by humidity, suffer such changes as weaken their medicinal properties. Changes, productive of the same result, are not unfrequently occasioned by the action of air and light. The methods by which these are counteracted, of which the most important is Exsiccation, belong to this division of pharmacy. It includes, too, the few general rules which are observed in collecting plants in that state of vigour and maturity in which they are possessed of the greatest degree of activity. And there belong to it also those operations which are necessary to preserve unaltered the few animal products employed in medicine.

Under the second branch of Pharmacy, the Preparation of Medicines, are included a number of important operations, agreeing in general in affording substances different, more or less, in chemical constitution, from the substances operated on.

The medicinal powers of vegetable substances, it has already been remarked, frequently reside in peculiar proximate principles, which, from their relations to certain solvents, can be separated from each other; and thus, in many cases, the principle on which the medicinal activity of the substance depends, can be obtained in a pure and concentrated state. Resins, for example, are dissolved by alkohol, gums by water, extractive matter by either of these liquids, or by a mixture of both; and by this separation advantages are often obtained; the medicine is rendered more certain in its operation; it is more easily preserved, or more conveniently administered. On this are founded the various pharmaceutic preparations of infusions, decoctions, tinctures, medicated wines or vinegars, and extracts;—forms under which medicines are often employed in preference to their natural state.

The proximate principles of plants are sometimes obtained apart by other processes, as by distillation, or even by mechanical expression, whence other forms of preparation are obtained.

To this division belong too the Saline and Metallic Preparations. These are entirely the results of chemical processes; they are new remedies formed by chemical combination, and are possessed of properties altogether different from those of the substances from which they are prepared.

In all these preparations, chemical changes are produced to a greater or less extent. Medicines are also, however, frequently given in a state of mixture, in which they either exert no mutual chemical action, or none producing any modification of their powers. This forms what is named Composition in Pharmacy. It is employed with different views; sometimes, for example, to conceal a medicine, to render it less unpleasant, or to give it a convenient form. And frequently more important advantages are attained; the action of one medicine on the system, or on a particular organ, so far co-operating with that of another, as to render its operation more certain, or more powerful, or even sometimes giving rise to such a modification, as to produce an effect different from that which would be obtained from the action of either.

Pharmacy, as practised in this country, is regulated by the Pharmacopœias of the respective Colleges. As many of the processes are necessarily alike, I had, in the former, edition of this work, given an entire translation of the Edinburgh Pharmacopœia only, and introduced merely those preparations in the London and Dublin Pharmacopœias which are peculiar or important. I have thought it now preferable, however, to give a translation of the processes of all the Pharmacopœias, as more satisfactory, and conveying a more full and distinct view of Pharmacy. The order of the chapters, and their titles, are those of the Edinburgh Pharmacopœia.

## CHAP. I.

### PREPARATIONS OF SOME SIMPLE MEDICINES.

Under this title given to the first Chapter in the Edinburgh Pharmacopœia, a few preparations, simple in themselves, and which could not well be placed under the other chapters, are inserted. I have added to it some similar preparations from the London and Dublin Pharmacopœias.

HERBARUM ET FLORUM EXSICCATIO. Drying of Herbs and Flowers. Edin.

Herbs and Flowers are to be dried with the gentle heat of a stove, or a common fire, in such a quantity that the drying may be performed as quickly as possible. Their virtues are thus best preserved, the mark of which is their retaining completely their native colour. The leaves of hemlock, and others containing a subtile volatile matter, are, immediately after drying, to be rubbed to powder, and kept in glass vessels well stopt.

HERBARUM EXSICCATIO. Drying of Herbs. Dub.

Let the recent leaves of the herb gathered when in flower be put into paper bags, and expose them to a low degree of heat for an hour; then spread them lightly on a sieve, and dry them as quickly as possible, taking care that their green colour is not injured by too high a heat: if they are to be used under the form of powder, let them be reduced to powder immediately, and let this be kept in opaque phials well closed. Herbs and Flowers from which oils and distilled waters are to be procured, ought to be dried as soon as they are gathered.

By drying herbs and flowers, or expelling a great part of the water they contain, those spontaneous chemical changes which are favoured by humidity are prevented, and they are rendered capable of being preserved. The more quickly they are dried, they retain in general their virtues more completely, care only being taken that too much heat be not applied, as from this, part of their volatile principles would be dissipated, and their flavour and medicinal qualities impaired. Even when dried, they suffer some changes in keeping, probably from the action of the air and light; and some do so more rapidly than others. Hemlock, in particular, has its colour and odour impaired in a very short time; it is therefore necessary to exclude it from the air, and likewise from exposure to light.

SCILLA MARITIMA EXSICCATA. Dried Sea Squill. Ed.

Cut the root of the sea squill, its outer covering having been removed, transversely, into thin slices, and dry it by a gentle heat. The mark of its being properly dried is, that while it is rendered friable it retains its bitterness and acrimony.

PULVIS SCILLÆ. Powder of Squill. Dub.

Let the roots of squill, freed from their membranous integuments, and cut into transverse slices, be dried on a sieve with a gentle heat: then reduce them to powder, which must be kept in glass phials well stopt.

By drying, the squill loses about four-fifths of its weight, and with very little diminution of its powers, if too much heat has not been applied. It is in this state that it is commonly employed in medicine, and for other pharmaceutic preparations. It requires to be kept in a dry place, as otherwise it regains its softness, and is liable to become mouldy. Though the Dublin college order it to be reduced to powder, it is better to preserve the dried root without pounding it.

PULPARUM EXTRACTIO. Extraction of Pulps. Ed.

Those fruits which afford a pulp, if they are unripe, or if ripe and dry, boil with a little water, that they may become soft. Then express the pulp through a hair-sieve, and boil it with a gentle heat in an earthen vessel, stirring it frequently that it may not burn, until it attain the consistence of honey.

The pulp of cassia fistula is to be boiled from the bruised pod; and then, by evaporating the water, to be reduced to the due consistence. The pulps of ripe and fresh fruits are to be pressed through a sieve, without previous boiling.

PULPARUM EXTRACTIO. Extraction of Pulps. Dub.

Fruits, the pulps of which are to be extracted, if they are unripe, or, if ripe and dry, are to be boiled with a small quantity of water until they become soft. The pulps being pressed through a hair-sieve are to be evaporated to a proper consistence, by a slow evaporation.

These directions are given principally for the preparation of the pulps of several fruits which enter into the composition of the Electuary of Senna. Pulps are seldom otherwise medicinally employed, and they cannot be long preserved unchanged.

The following general directions are given in the London Pharmacopœia, with regard to collecting the vegetable articles of the Materia Medica.

Vegetabilia. Vegetables. Lond.

Vegetables are to be gathered from the soil and situations where they spontaneously grow, at a dry season, and when not moistened with rain or dew: they ought to be collected annually, and if they have been kept for a longer period, ought to be rejected.

Roots, in general, are to be dug up before their stalks or leaves shoot forth.

Barks ought to be collected at that season at which they are most easily separated from the wood.

Leaves are to be gathered after the flowers have unfolded, and before the seeds have ripened.

Flowers are to be collected recently blown.

Seeds are to be taken when they are ripe, and before they begin to fall from the plant. They ought to be preserved in the seed vessels.

Vegetabilium præparatio. Preparation of Vegetables Lond.

Vegetables, soon after they are collected, those excepted which are to be used in the recent state, are to be spread out lightly, so as to dry as quick as possible, with a heat so gentle, that their colour may not change; they are then to be kept in proper vessels, or situations where the access of light and humidity may be excluded.

Roots, which are ordered to be kept fresh, ought to be buried in dry sand. The root of squill, before drying it, is to be cut transversely into thin slices, the outer dry layers being removed.

Pulpy fruits, if they are not ripe, or, if ripe and dry, are to be exposed in a damp place until they become soft, then press out the pulp through a hair-sieve, afterwards boil with a gentle heat, stirring frequently; lastly, dissipate the water by the heat of a water bath, until it has become of the proper consistence.

On the pods of cassia bruised, pour boiling water, so as to wash out the pulp, which press first through a sieve with large holes, afterwards through a hair-sieve, then evaporate the water by the heat of a water-bath, until the pulp attain the proper consistence.

Press the pulp or juice of ripe and fresh fruits through a sieve, without any previous boiling.

GUMMI RESINÆ. Gum Resins. Lond.

Separate OPIUM carefully from extraneous substances, especially on its external surface. Let it be kept in the state of Soft Opium, fit for forming pills; and Hard Opium, rendered so by having been dried in the heat of a water-bath, so that it can be rubbed to powder.

Those GUM-RESINS are to be accounted of the best quality, which can be selected so pure, as to require no purification. If they appear to be less pure than this, boil them in water until they become soft, and press them by a press through an hempen bag; then put them aside, that the resinous part may subside. The liquor above being poured off, evaporate it by the heat of a water-bath, adding towards the end of the evaporation the resinous part, and mixing it thoroughly with the gummy part into one mass.

Those GUM-RESINS which melt easily may be purified by being put into an ox bladder, and kept in boiling water until they become soft, so that they may be separated from the impurities by being pressed through an hempen cloth.

The BALSAM of STORAX is to be dissolved in rectified spirit; and strained; the spirit is then to be distilled with a gentle heat, until the balsam become of the proper consistence.

STYRAX PURIFICATA. Purified Storax. *Dub.*

Digest Storax in water with a gentle heat, until it become soft; then press it between iron plates heated by boiling water; and lastly free it from the water.

These directions, for the purification of Gum-resins, are the most proper perhaps that can be given; but they are omitted by the Edinburgh College, as it is always preferable to use them medicinally, only when in that state in which they do not require purification; for, however cautiously the operation may be performed, they are liable to suffer some change, either from the dissipation of volatile principles, or from changes of composition in those which are fixed. The process is admissible, therefore, only with regard to gum-resins, which are to be applied externally, as ammoniac or galbanum, when they are to form the basis of plasters. Storax is a substance so rarely employed in medicine, that the ordering it to be purified may be regarded as superfluous. The process given by the Dublin College is more economical than that of the London Pharmacopœia, but must occasion some dissipation of its odorous matter, on which all its powers depend. The directions given by the London College with regard to Opium, are preferable to a process formerly admitted, and which is to be afterwards noticed, as being still retained in the Dublin Pharmacopœia, in which opium is dissolved in proof spirit, and the tincture is strained, and again evaporated to the due consistence,—a process in which the opium always sustains a diminution of power, so as to be rendered less active, and less certain in its operation.

Præparata ex animalibus. Preparations from Animals. Lond.

Adeps præparata. Prepared Lard. Lond.

Cut the fat into small pieces; then press it, liquefied by a gentle heat, through linen.

ADEPS SUILLUS PRÆPARATUS. Prepared Hogs Lard. Dub.

Let fresh lard, cut into small pieces, be melted by a gentle heat, and strained by pressing it through a cloth.

Lard, which is prepared by those who sell it, and which is preserved with salt, is to be melted with twice its weight of boiling water, the mixture being well stirred. It is then to be set aside to cool, and the lard is to be separated.

SEVUM PRÆPARATUM. Prepared Suet. Lond.

Cut suet into pieces; then press it, melted by a gentle heat through linen.

The design of these processes is to free the fat from the membranous fibres intermixed with it; but as it is generally prepared before it is brought to the shops, the Edinburgh College have omitted the directions they formerly gave. If the heat be raised too high, the fat acquires a brown colour and empyreumatic smell; it is therefore usually melted with a little water, by which this is prevented.

CERA FLAVA PURIFICATA. Purified Yellow Wax. Dub.

Take of yellow wax any quantity, melt it with a moderate heat; take off the scum, and after allowing it to settle, pour it off from the impurities.

CORNU USTUM. Burnt Horn. Lond.

Burn pieces of horn in an open fire, until they become perfectly white; then rub them to powder, and prepare them in the same manner that chalk is prepared.

PULVIS CORNU CERVINI USTI. Powder of Burnt Hartshorn. Dub.

Burn pieces of hartshorn, until they become perfectly white, then reduce them to a fine powder.

Horn appears to consist chiefly of indurated albumen, with a portion of gelatin; the quantity of phosphate of lime it contains is usually small, and in this respect it differs essentially from bone. It is singular, however, that the horns of the deer approach very closely to bone in composition, and afford a large quantity of phosphate of lime when calcined. The Dublin College, therefore, properly name Hartshorn as the kind of horn to be burnt. During the burning, the gelatin of the horn is decomposed; its carbonaceous matter partly remains, giving a black colour; but by continuing the heat, this also is burnt out. The phosphate of lime, which is the product of the process, is a substance apparently altogether inert, though, from a theoretical view as to the cause of rickets and mollities ossium, it has been proposed to be given as a remedy in these diseases. It is used to reduce substances which are rather soft and tenacious, as opium, to powder, being rubbed along with them; and its powder is sometimes employed as a dentifrice.

**SPONGIA USTA.** Burnt Sponge. Lond.

Cut sponge into pieces; and bruise it, so that it may be freed from adhering extraneous bodies; then burn it in a close iron vessel, until it become black and friable; lastly, rub it into a very fine powder.

**PULVIS SPONGÆ USTÆ.** Powder of Burnt Sponge. Dub.

Bruise sponge cut in small pieces, so as to free it from small stones; then burn it in a close iron vessel, until it become black and friable; and, lastly, reduce it to powder.

Burnt sponge has been celebrated as a remedy in bronchocele, and in scrofulous affections of the glands, given in a dose from 20 to 30 grains. It contains carbonate and muriate of soda and carbonaceous matter. It has been stated as a reason for its being retained in the London Pharmacopœia, that it produces effects as a medicine, which are not to be obtained from a mixture of the saline matter and charcoal alone.

PULVIS QUERCUS MARINÆ. Powder of Sea Oak, or Sea Wrack. Dub.

Take of sea wrack with its vesicles any quantity. Dry and free it from its impurities; then expose it in an iron pot or crucible, to which a perforated cover is adapted, to the fire, until the vapours which arise having ceased, the mass becomes of a dull red. Reduce the carbonaceous matter which remains to powder.

This substance is analogous to the preceding preparation, and has been supposed to have similar medicinal powers.

TESTÆ PRÆPARATÆ. Prepared Shells. Lond.

Wash the shells previously freed from impurities with boiling water; then prepare them in the manner ordered with regard to chalk.

OSTREARUM TESTÆ PRÆPARATÆ. Prepared Oyster Shells. Dub.

OVORUM TESTÆ PRÆPARATÆ. Prepared Egg Shells. Dub.

These are to be prepared in the same manner as chalk.

These substances are supposed to afford varieties of carbonate of lime purer than prepared chalk. The product is at least more smooth, and free from the coarser earthy matter diffused through chalk. It contains too a portion of animal matter, probably gelatin, but so highly indurated as not to be easily extracted by water, and not to be liable to spontaneous decomposition. They are in common use as antacids.

Under this Chapter, the Edinburgh College have inserted a preparation of sulphur, the Washed Sulphur; to which may be added, the Precipitated Sulphur of the London Pharmacopœia.

Sulphur sublimatum lotum. Washed Sublimed Sulphur. Ed.

Take of Sublimed Sulphur, one pound; Water, four pounds. Boil the sulphur for a short time in the water, then pour off this water, and adding cold water wash away all the acid; lastly, dry the sulphur.

Sulphur lotum. Washed Sulphur. Lond.

Take of Sublimed Sulphur, a pound. Pour upon it boiling water, that the acid, if there is any, may be washed out; then dry.

Sulphur sublimatum lotum. Washed Sublimed Sulphur. Dub.

Let warm water be poured on sublimed sulphur, and let the washing be repeated as long as the water poured off has received any acidity, which may be known by the test of litmus. Dry the sulphur on bibulous paper.

The sublimation of sulphur is usually conducted on a large scale, and the vapours of the sulphur, which first rise, receiving a little oxygen from the atmospheric air of the subliming vessel, or of the chamber in which they are condensed, a slight degree of acidity is liable to be acquired, which it is the object of this process to remove. Any acidity, however, is so slight, that it is scarcely perceptible in the sublimed sulphur of the shops; the process is therefore superfluous, and is never attended to.

Sulphur præcipitatum. Precipitated Sulphur. Lond.

Take of Sublimed Sulphur, one pound; Lime recently prepared, three pounds. Boil the sulphur and the lime together in water; strain the liquor through paper, and drop into it muriatic acid, as much as may be sufficient to precipitate the sulphur. Lastly, pouring water on this frequently, wash it until it remain tasteless.

The sulphur is in the first stage of this process combined with the lime; and, at the same time, as always happens when sulphur is enabled to act on water by the resulting affinity of an alkaline base, a decomposition of a portion of the water takes place; its oxygen unites with a little of the sulphur, and forms sulphuric acid, with which part of the base combines; the hydrogen of the decomposed water unites with another portion of sulphur, forming sulphuretted hydrogen, and this enters into combination with the remaining sulphur, and base, and by its affinity prevents any farther decomposition. The solution, therefore, neglecting the small portion of sulphate which it may contain, is a ternary compound of sulphur, sulphuretted hydrogen, and the alkaline or earthy base. When an acid is added, it combines with the base, and precipitates the sulphur, while the small quantity of sulphuretted hydrogen is disengaged in the elastic form. In the present process, therefore, the solution obtained by boiling the lime and sulphur, is a compound of these with sulphuretted hydrogen, what may be named a Sulphuretted Hydro-sulphuret of Lime. On adding the muriatic acid, it combines with the lime; and this muriate of lime being very soluble, remains dissolved in the water; the sulphuretted hydrogen is disengaged; and the sulphur being insoluble is precipitated. The proportion of lime ordered by the college is unnecessarily large; it might be diminished at least one-third.

The process, under this point of view, may be supposed to have no object, as the sulphur is merely recovered; and it cannot indeed be said to have much advantage. The precipitated sulphur, however, is of a whiter colour than sublimed sulphur, and is therefore preferred in making sulphur ointment, the only purpose to which it is applied. This whiteness may be owing either to its state of aggregation, or to its combination with a little water, for the yellow colour is restored on melting it. That it is owing to the presence of water, is rendered probable, from the same whiteness being produced by dropping water on melted sulphur, or receiving the vapours of sulphur in a vessel filled with watery vapour. Common sulphur, it appears from the younger Berthollet's experiments, contains hydrogen; and it is not improbable, that precipitated sulphur may contain a larger proportion of hydrogen, which it may attract in its precipitation. The whiteness of the precipitated sulphur of the shops is usually increased by precipitating the solution of the sulphuretted hydro-sulphuret of lime, not by muriatic, but by sulphuric acid, sulphate of lime being thus formed and thrown down, intimately mingled with the sulphur. This renders it less pure, and therefore less fit for internal administration.

# CHAP. II.

## CONSERVÆ.—CONSERVES.

CONSERVES are compositions of fresh vegetable matter with sugar. The form is designed to preserve such vegetables as lose their virtues by drying: to obviate the decomposition to which this matter is liable, three times its weight of refined sugar is in general necessary. The active matter of vegetables is, however, generally injured by keeping in this form; and, therefore, there is no conserve ordered in the Pharmacopœias of any powerful medicine, those which are inserted being merely recommended by their agreeable flavour, and being not used but as vehicles for the exhibition of more active remedies, under the form of bolus, pill, or electuary.

The Edinburgh College admit three conserves.

Conserva exterioris recentis fructus CITRI AURANTII radula abrasa: Conserve of the outer rhind of the Orange rasped by a grater;

Conserva Fructus ROSÆ CANINÆ maturi, a seminibus eorumque pube solicite purgati: Conserve of the Fruit of the Dog-hip, carefully freed from the seeds and included down;

Conserva Petalorum ROSÆ GALLICÆ nondum explicitorum: Conserve of the Unblown Petals of the Red Rose;

With regard to all which, they give, as the directions for their preparation, that the vegetable matter is to be beat into a pulp, to which is to be added gradually, during the beating, three times its weight of refined sugar.

The London College have united the Conserves with the preparations named Electuaries, and have given them the common name of Confections. Of those which correspond with what have usually been denominated Conserves, they have retained the three which have a place in the Edinburgh Pharmacopœia: and have given the following directions for the preparation of each. The Dublin College admit only the Conserve of the Rhind of the Orange, and the Conserve of the Petals of the Red Rose.

Confectio aurantii. Confection of Orange Peel. Lond.

Take of the exterior Rhind of the Orange fresh, separated by a grater, a pound; Refined Sugar, three pounds. Bruise the rhind in a stone mortar with a wooden pestle, then adding the sugar, bruise again until they unite into a mass.

Conserva aurantii. Conserve of Orange Peel. Dub.

To the Rhind of the fresh Seville Orange, rasped off, add, while beating it, three times its weight of refined sugar.

Confectio rosæ caninæ. Confection of Dog-hip. Lond.

Take of the Pulp of the Dog-hip, a pound; Refined Sugar, beat down, twenty ounces. Rub them together until they form an uniform mass.

Confectio rosæ gallicæ. Confection of the Red Rose. Lond.

Take of the Petals of the Red Rose, not fully blown, with the heels removed, a pound; Refined Sugar, three pounds. Bruise the petals in a stone mortar, then, adding the sugar, beat again until they form an uniform mass.

Conserva rosæ. Conserve of Red Rose. Dub.

Pluck off the Petals of the Red Rose buds, from the calyces, and having freed them from the heels, beat them, adding gradually three times their weight of refined sugar.

Of the above Conserves, that of Orange Peel is so little used, that it is seldom to be found in the shops. The Conserve of Dog-hip is smooth and uniform in its consistence, and is therefore well adapted to the purpose to which it is applied, that of serving as a vehicle for active medicines, under the form of bolus or pill. The Conserve of the Petals of the Red Rose is supposed to retain their slight astringency, and at one time was celebrated as a remedy in hæmoptysis and phthisis. It is still a popular medicine in these diseases, being taken in the dose of an ounce in the morning, diffused in warm milk.

## CHAP. III.

### SUCCI.—JUICES.

JUICES are obtained from fresh vegetables by expression. They consist chiefly of the sap of the plant, mixed, more or less, with the proper juices; and according as these are in greater or less abundance, or easily expressed from their vessels, the juice will be more largely impregnated with them. It may hold dissolved mucilage, extractive matter, tannin, and any of the vegetable acids; and fecula is frequently suspended in it, with sometimes perhaps a portion of resin, diffused by the medium of the other principles.

When newly expressed, these juices are generally impure and viscid: on standing for some time, they deposite a quantity of mucilaginous and glutinous matter along with grosser impurities; the clear liquor is poured off, and passed repeatedly through a fine linen cloth, by which it is rendered more pure. A small quantity of alkohol, generally about one-fortieth part of the weight, is added; the juice, on standing, deposites, after this addition, another sediment; from this it is poured off, and the clear liquor is put into bottles, well closed, which are to be kept in a cool place. By these processes, however, much of the active matter is frequently removed, or chemically changed, and the juice is rendered comparatively inert; and besides it is always liable to decomposition on keeping, from the reaction of the elements of the vegetable matter. This form of preparation is therefore an improper one; it is rejected, with propriety, from the London and Dublin Pharmacopœias; and there is only one officinal juice retained by the Edinburgh College, which might also be discarded, as it is never used, nor kept in the shops. It is named

SUCCUS COCHLEARIÆ COMPOSITUS, *vulgo Succi ad Scorbuticos.* Compound Juice of Scurvy Grass. Ed.

Take of Juice of Scurvy Grass, Juice of Water Cresses from the herbs recently gathered, Juice of the fruit of the Orange, of each two pounds; Spirit of Nutmeg, half a pound. Mix them, and put aside the liquor until the impurities subside; then pour it off."

This used to be employed as a remedy in scurvy, in the dose of half a pound daily; but it has long been in total disuse.

## CHAP. IV.

### SUCCI SPISSATI, VULGO EXTRACTA.—INSPISSATED JUICES, COMMONLY NAMED EXTRACTS.

THE juice expressed from succulent vegetables, frequently holds dissolved, or diffused through it, the principles in which the medicinal powers of the plant reside; mucilage, the principle more peculiarly named extract, tannin, fecula, and even a portion of resin. But containing a large proportion of water, and being liable to decomposition, the process of inspissation is employed to obtain the active matter in a more concentrated state, and to obviate this spontaneous change. The preparations thus obtained are named Inspissated Juices, formerly Extracts.

In the greater number of cases, however, this operation cannot be performed without injury to the active matter. Any volatile principle is necessarily dissipated; and even where there is no injury of this kind, the vegetable matter, at the temperature required, suffers decomposition, either from the re-action of its elements, in consequence of which they enter into new combinations, or from the chemical action of the oxygen of the air. Extractive matter, such as that contained in the juices of plants, becomes insoluble from mere exposure to the air, as Vauquelin observed: this change takes place more rapidly at the temperature of boiling water, as Fourcroy has shewn; and T. Saussure, who has examined these changes more minutely, has found that they are accompanied with an absorption of oxygen from the air, and a formation of carbonic acid, with probably, likewise, as he inferred, a formation of water, from the union of part of the oxygen and hydrogen of the vegetable matter. Such changes must give rise to alterations in the medicinal powers of these substances, and hence we cannot rely on the activity and uniformity of operation in these inspissated juices. Even after they are prepared too, they must continue to suffer a slow spontaneous decomposition, and their activity must diminish with age.

From the analysis of these inspissated juices, they appear to contain usually a large proportion of saline matter, principally acetates of potash, lime and ammonia, sulphate and muriate of potash, and sulphate of lime, with frequently so much free acetic acid as to redden litmus; they exhale vapours of acetic acid when acted on by sulphuric acid, and they give an ammoniacal smell when rubbed with lime.

The directions for preparing the inspissated juices are given in the Edinburgh Pharmacopœia, under the formula for the first of them, that of Wolfsbane.

The fresh leaves of the Aconite are to be bruised, and being inclosed in an hempen bag, are to be pressed strongly, that they may give out their juice, which is to be reduced by evaporation in open vessels, heated by boiling water saturated with muriate of soda, to the consistence of thick honey. The mass, after it has cooled, is to be kept in glazed earthen vessels, and moistened with alcohol.

In the same manner are to be prepared Inspissated Juices from the leaves of Deadly Nightshade, of Hemlock, of Henbane, and of Wild Lettuce. The London College admit the same Inspissated Juices, with the exception of the last, giving them the name of extracts. They give the following directions with regard to each. "Bruise the recent leaves in a stone mortar, sprinkling upon them a small quantity of water, then express the juice, and without any defecation evaporate it until it attain a proper consistence;" the general direction being also given with regard to the evaporation, " that it is to be performed in a broad shallow vessel, by the heat of a water bath, until the consistence is that fit for forming pills, stirring constantly with a spatula towards the end of the evaporation." The Dublin College admit only the Inspissated Juices of Hemlock and Henbane, giving the following directions under the preparation of the former. " Express the leaves of Hemlock, gathered when the flowers are just appearing, and put aside the juice for six hours, that the impurities may subside, then evaporate the pure juice with a gentle heat to the consistence of an extract." The propriety of the direction of allowing any matter to subside from the juice before evaporation is doubtful, as the matter deposited is frequently possessed of considerable activity. It is not given therefore by the other colleges, and the London College order even the juice to be evaporated without any such purification.

SUCCUS SPISSATUS ACONITI NAPELLI. Inspissated Juice of Wolfsbane, Ed. EXTRACTUM ACONITI. Extract of Wolfsbane. Lond.

This inspissated juice is the form under which wolfsbane was introduced into practice by Störck. He recommended it in glandular swellings, scrofulous and venereal affections, gout, and in obstinate chronic rheumatism, in a dose of half-a-grain night and morning, and gradually increased to 5 or 6 grains. It is very seldom prescribed.

SUCCUS SPISSATUS ATROPÆ BELLADONÆ. Inspissated Juice of Deadly Nightshade. Ed. EXTRACTUM BELLADONÆ. Lond.

This has been recommended by the German practitioners in scirrhus, cancer, in epilepsy and mania, in a dose of one grain gradually increased. It retains the peculiar property of the plant, that of occasioning dilatation of the pupil, whence it has also been prescribed in amaurosis.

SUCCUS SPISSATUS CONII MACULATI. Inspissated Juice of Hemlock. Ed. SUCCUS SPISSATUS CICUTÆ. Dub. EXTRACTUM CONII. Lond.

Under this form, hemlock was employed by Störck in scirrhus and cancer. The dose given is at first two grains, but it requires to be quickly increased, and it has at length been taken to the extent of several drachms in the day. In the preparation of it, the narcotic power of the hemlock seems always to be more or less impaired; it is also injured by keeping, and we have no other test of its activity than the strength of its narcotic odour. It is therefore inferior to the dried leaves of the plant, though these are likewise liable to a considerable degree of uncertainty, according to the manner in which they have been dried and preserved. A common form of exhibition is that of the inspissated juice made into pills by the addition of a sufficient quantity of the powder of the leaves; but, on the whole, the powder alone is to be preferred, both as being in general more active and uniform, and as we have a test of its proper preparation more certain in the richness of its green colour.

SUCCUS SPISSATUS HYOSCYAMI NIGRI. Inspissated Juice of Black Henbane. Ed. Dub. EXTRACTUM HYOSCYAMI. Lond.

This inspissated juice retains a considerable degree of narcotic power, and is a form under which Henbane is occasionally employed as a substitute for opium. The dose has been usually one grain, which requires to be increased; two grains are perhaps not more than equivalent to one grain of opium. The tincture has been introduced as a more certain preparation.

SUCCUS SPISSATUS LACTUCÆ VIROSÆ. Inspissated Juice of Strong-Scented Lettuce. Ed.

This plant, though a narcotic, has been principally used as a diuretic. It was recommended as a remedy in dropsy by the German practitioners, in a dose of four or five grains, gradually increased to one or two drachms in twenty-four hours; but in this country it has been little used.

SUCCUS SPISSATUS SAMBUCI NIGRÆ, *vulgo Rob Sambuci*. Inspissated Juice, or Rob of Elder. Ed.

Five pounds of the juice of Elder Berries, and one pound of Sugar, are to be boiled with a gentle heat to the consistence of thick honey.

SUCCUS SPISSATUS SAMBUCI. Inspissated Juice of Elder. Dub.

Let the juice from the fresh Berries of the Elder, be prepared in the same manner as the inspissated juice of hemlock.

This preparation has been given as an aperient or moderate laxative and diuretic in a dose of half an ounce, or one ounce; but it possesses no quality to recommend it.

SUCCUS SPISSATUS MOMORDICÆ ELATERII, *vulgo Elaterium*. Inspissated Juice of Wild Cucumber, or Elaterium. Ed.

Cut the ripe fruit of the Wild Cucumber, and pass through a very fine hair-sieve the juice lightly expressed; boil it a little, and set it aside for some hours until the thicker parts subside.

Pour off the thinner part which floats above, and separate the rest by straining. The thicker part which remains after the straining, being covered with a linen cloth, is to be dried by a gentle heat.

EXTRACTUM ELATERII. Extract of Elaterium. Lond.

Cut the ripe fruit of Elaterium, and strain the juice very lightly expressed through a fine hair-sieve into a glass vessel; then put it aside for a few hours, until the thicker part subsides. The thinner part which swims above being rejected, dry the thicker part with a gentle heat.

ELATERIUM. Elaterium. Dub.

Cut ripe Wild Cucumbers, and strain the juice lightly expressed through a very fine hair-sieve into a glass vessel. Put it aside for some hours until the thicker part subside: the liquid above being rejected, dry the fecula on a linen cloth, covered by another, with a gentle heat.

From the mode of preparation, it is obvious that this consists of a matter which had been suspended in the juice: hence it has been generally regarded as a species of fecula, without having been, however, very particularly examined; and from its not being dissolved during the slight boiling of the juice, it would even appear to be of a different nature. It is a very violent cathartic, operating powerfully in a dose of one or two grains. It has been used as a hydragogue in dropsy, and as a cathartic in obstinate constipation, where others have failed. The violence, and, in some measure, the uncertainty of its operation, prevent its frequent use; and it is seldom even to be found in the shops.

## CHAP. V.

### OLEA FIXA SIVE EXPRESSA.—FIXED OR EXPRESSED OILS.

Expressed Oils are distinguished by their unctuosity and insipidity, by being insoluble in water and in alcohol, incapable of volatilization without change, and by combining with the alkalis, forming soaps. They exist in the fruit and seeds of vegetables, and are obtained by expression, or decoction with water. The former method is in general to be preferred; and to afford the oil pure it must be performed without heat, which, though it favours the separation of the oil, communicates to it acrimony and an unpleasant flavour. The process, however, is seldom performed in the shops. To preserve them from becoming rancid, they ought to be kept secluded from the air, this change being produced in them by absorption of oxygen.

A process in Pharmacy somewhat difficult is to mix these oils with any watery fluid, so that they may be conveniently exhibited. It is usually done by the medium of mucilage, or of an alkali. If triturated with mucilage, and a small quantity of sugar, the oil is diffused through the water, and a milky liquor is formed, in which, however, the diffusion is rather imperfect. A combination more complete and permanent is effected, by adding a few drops of water of ammonia, or two or three grains of sub-carbonate of potash, without the mucilage.

Oleum amygdalæ communis. Oil of Almonds. Ed.

Take of Fresh Almonds any quantity. Bruise them in a stone-mortar, inclose them in a hempen bag, and express the oil by a press without heat.

Oleum amygdalæ. Almond Oil. Lond.

Macerate Almonds, either sweet or bitter, in cold water for twelve hours, and bruise them; then, without applying any heat, express the oil.

Oleum amygdalarum. Oil of Almonds. Dub.

Bruise Fresh Almonds in a mortar, and express the oil without heat, by a press.

This oil is the purest of the expressed oils, being limpid and entirely free from odour or taste. It is used as a demulcent, and for the general medicinal purposes to which expressed oils are applied.

Oleum lini usitatissimi, Oil of Lintseed; Oleum lini. Lond. and Dub. This oil is directed to be expressed in the same manner, from the seeds of the plant. Being less pure, it is used only as an external application. Usually, it is prepared on the large scale; and to remove the mucilage, heat is employed in the expression.

Oleum ricini, Castor Oil. Lond. Bruise the seeds, from which the external pellicle has been removed, and express the oil without any application of heat.—This oil is usually prepared in the West Indies by decoction, and is milder than when obtained by expression. Hence in the Pharmacopœias of the other colleges, it is merely inserted in the catalogue of the Materia Medica.

This is the case too with the Olive Oil, Oleum oleæ europææ, which of all the expressed oils is most largely employed; it is imported from the South of Europe.

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# CHAP. VI.

## EMULSIONES. EMULSIONS.—MISTURÆ. MIXTURES.

Emulsions are preparations in which the expressed oil of the seeds or kernels, from which they are made, is diffused through water by the medium of the sugar, mucilage, and fecula, which the seeds contain. They may be made from lintseed, from the seeds of the poppy, and from other oily seeds: but almonds are always preferred, as being free from any disagreeable flavour or taste. They are always opaque and milky. As the oil is merely diffused through the water, it gradually separates and rises towards the surface. The fluid beneath is like whey in its appearance, and it soon becomes acescent from the slow fermentation of the saccharine matter. The addition of vinous spirits, or of any weak acid, decomposes emulsions, separating the oil. In prescribing them, therefore, it is necessary to avoid combining with them any tincture, or any substance having acidity.

Emulsio amygdalæ communis. Almond Emulsion. Ed.

Take of Sweet Almonds, one ounce; Water, two pounds and a half; beat the blanched almonds carefully in a stone-mortar, adding the water gradually, then strain.

Lac amygdalæ. Milk of Almonds. Dub.

Take of Sweet Almonds, blanched, an ounce and a half; Refined Sugar, half an ounce; Water, two pints and a half.

Triturate the almonds with the sugar, adding the water gradually, then strain.

MISTURA AMYGDALÆ. Almond Mixture. Lond.

Take of Almond Confection, two ounces; Distilled Water, a pint; add the water gradually to the confection, and rub them together.

The almonds are blanched, or freed from their thin rhind, by keeping them a minute or two in boiling water, after which the rhind is easily detached. They require to be well triturated with the first portions of water, as it is added. The formula of the London College affords a method of preparing the emulsion more easily, extemporaneously; but this is an advantage scarcely of sufficient importance to justify the alteration of the mode of preparation; and the almond confection, if long kept, may be liable to spontaneous decomposition. The emulsion is used as a diluent and demulcent in catarrh and gonorrhœa, or during the application of a blister, to prevent the occurrence of strangury, being drunk *ad libitum*, and it is more grateful than any other preparation.

EMULSIO GUMMI MIMOSÆ NILOTICÆ, *vulgo Emulsio Arabica.* Arabic Emulsion. Ed.

This is made in the same manner, adding, while beating the almonds, two ounces of mucilage of Gum Arabic.

EMULSIO ARABICA. Arabic Emulsion. Dub.

Take of Gum Arabic, in powder, two drachms; Sweet Almonds, blanched, Refined Sugar, of each, half an ounce; Decoction of Barley, a pint. Dissolve the gum in the warm decoction, and when it is nearly cold, pour it gradually on the almonds, previously triturated with the sugar, rubbing them at the same time together, so as to form a milky liquor, which strain.

This emulsion is used in the same cases as the preceding, and from the addition of the mucilage is supposed to have more demulcent power.

EMULSIO CAMPHORATA. Camphor Emulsion. Ed.

Take of Camphor, one scruple; blanched Sweet Almonds, two drachms; Refined Sugar, one drachm; Water, six ounces: Let it be made in the same manner as the Almond Emulsion.

Camphor is less apt to occasion nausea or uneasiness at the stomach when given in a liquid than when in a solid form; and this is one of the best forms of preparation, the camphor being completely diffused. Its dose is two ounces, but as this narcotic is not much employed internally in modern practice, the camphor emulsion is not often prescribed.

## MISTURÆ.—MIXTURES.

To the preparations named Emulsions, the London College have extended the general name of Mixture, which is employed in Pharmacy to denote those preparations in which different ingredients are mingled together in the liquid form, or in which solid substances are diffused through liquids by the medium of mucilaginous or saccharine matter. And under this name of Mixture are inserted several compound medicines, both in the London and Dublin Pharmacopœia, of which it is necessary to take notice. Some of them had formerly a place in the Edinburgh Pharmacopœia; but they have been discarded, probably from the consideration that they must always be prepared extemporaneously, and may therefore be varied according to the intention of the prescriber.

Mistura ammoniaci. Gum Ammoniac Mixture. Lond.

Take of Gum Ammoniac, two drachms; Water, half a pint. Triturate the ammoniac with the water poured on it gradually until they are intimately mixed.

Lac ammoniaci. Milk of Ammoniac. Dub.

Take of Gum Ammoniac, one drachm; Penny-royal Water, eight ounces. Rub the gum with the penny-royal water added gradually, until the mixture has the appearance of milk, which strain through linen.

In this mixture the resinous matter is suspended in the water by the medium of the gum, and a milky liquor is formed. From this the resin subsides slowly. Under this form this gum-resin is sometimes prescribed as an expectorant, the dose of the mixture being from half an ounce to an ounce; the bitter taste, however, of ammoniac renders it not so well adapted to its exhibition as the form of pill.

Mistura assafoetidæ. Assafœtida Mixture. Lond.

Take of Assafœtida, two drachms; Water, half a pint. Rub the assafœtida with the water added gradually until they are perfectly mixed.

Lac assafoetidæ. Milk of Assafœtida. Dub.

Take of Assafœtida a drachm; Penny-royal water, eight ounces. Rub the assafœtida with the water gradually added, until it form an emulsion.

The resin of the assafœtida is in this mixture likewise suspended in the water by the medium of the gum. It is a form under which this fœtid drug is prescribed in the hysteric paroxysm, from half an ounce to an ounce being given and repeated at short intervals. Its operation as an antispasmodic is thus sooner obtained than when it is given in the solid form.

MISTURA CAMPHORÆ. Camphor Mixture. Lond.

Take of Camphor, half a drachm; Rectified Spirit ten minims; Water, a pint. Rub the camphor first with the spirit, then add the water gradually and strain.

MISTURA CAMPHORATA. Camphorated Mixture. Dub.

Take of Camphor, a scruple; Rectified Spirit of wine, ten drops; Refined Sugar, half an ounce; Water, a pint. Rub the camphor first with the spirit, then with the sugar; lastly, add the water while rubbing, and strain the mixture through linen.

Boiling water was formerly ordered in making this mixture, by which much of the camphor was volatilized, and very little of it dissolved. Even at a low temperature, the water scarcely dissolves any appreciable quantity, and it can be regarded only as receiving odour and some degree of taste, without any such impregnation as shall communicate to it medicinal efficacy. It serves, therefore, merely as a vehicle for other medicines.

MISTURA CORNU USTI. Mixture of Burnt Horn. Lond.

Take of Burnt Horn, two ounces; Gum Arabic in powder, one ounce; Water, three pints. Boil down to two pints, stirring constantly, then st .

DECOCTUM CORNU CERVINI. Decoction of Hartshorn. Dub.

Take of Burnt Hartshorn, rubbed to powder, two ounces; Gum Arabic, three drachms; Water, three pints. Boil, stirring constantly, to two pounds, and strain.

This is an absurd preparation, introduced at a time when the principles of Pharmacy were nearly unknown, and retained merely from the influence of habit. The burnt hartshorn, (which is chiefly phosphate of lime,) is perfectly insoluble in water; the gum alone therefore is dissolved; the hartshorn, by the continued boiling, is diffused, and kept suspended by the mucilaginous liquid; but this might equally be done without this operation; and when done it can communicate to the preparation no medicinal power whatever.

MISTURA FERRI COMPOSITA. Compound Mixture of Iron. Lond.

Take of Myrrh in powder, one drachm; Sub-carbonate of Potash, twenty-five grains; Rose Water, seven fluidounces and a half; Sulphate of Iron in powder, one scruple; Spirit of Nutmeg, half-a-fluidounce; Refined Sugar, a drachm. Rub the myrrh with the sub-carbonate of potash and the sugar, and, during the rubbing, add first the rose water, and the spirit of nutmeg, and afterwards the sulphate of iron. Put the mixture immediately into a proper glass vessel, which stop closely.

This, with a few trivial alterations, is the celebrated Antihectic Mixture of Griffith; which, as first invented, was undoubtedly an unchemical mixture, the prescriber not being aware of the changes produced in the active ingredients by their mutual action, but which, in practice, was found possessed of some peculiar advantages. The sulphate of iron, it is obvious, is decomposed by the sub-carbonate of potash, the sulphuric acid combining with the potash, while the carbonic acid unites with the oxide of iron. The carbonate of iron which is formed is diffused in the mixture along with the myrrh, and both are probably kept more completely suspended by an excess of alkali. This chalybeate proves much less irritating than the sulphate of iron, producing no unpleasant effect on the stomach, and at the same time it is more active than the common carbonate or rust of iron, in which the iron is at the maximum of oxidation, while, in the present preparation, it is at the minimum, is in a different state of aggregation, and probably combined with a larger quantity of carbonic acid. To preserve it in this low state of oxidation, it is ordered to be kept in a bottle closely stopt; but as iron has a strong tendency to pass to a more highly oxidated state, and suffers this change very rapidly from the action of the air, it is preferable that the preparation should be always extemporaneously made. Griffith's mixture is employed as a remedy in hectic fever, in some forms of phthisis and chronic catarrh, in chlorosis, and other diseases in which iron is given as a tonic, and is often attended with marked benefit. The mixture of the London Pharmacopœia, which is nearly of the same strength, may be given in the same cases in a dose of an ounce once or twice a-day.

MISTURA GUAIACI. Guaiac Mixture. Lond.

Take of the Gum-Resin of Guaiac, a drachm and a half; Refined Sugar, two drachms; Mucilage of Gum Arabic, two fluidrachms; Cinnamon Water, eight fluidounces. Rub the guaiac with the sugar, then with the mucilage, adding gradually, while these are rubbed together, the cinnamon water.

This may be a convenient form for the exhibition of guaiac, but is not possessed of any very peculiar advantage: nor does there appear to be much propriety in multiplying these extemporaneous prescriptions.

MISTURA MOSCHI. Musk Mixture. Lond.

Take of Musk, Gum Arabic, Refined Sugar, of each one drachm; Rose Water, six fluidounces. Rub the musk with the sugar, then with the gum, and add gradually the rose water.

The same observation applies to this as to the preceding preparation. Its dose, when it is prescribed, is an ounce, or an ounce and a half.

AQUA PICIS LIQUIDÆ. Tar Water. Dub.

Take of Tar, by measure, two pounds; Water, a gallon. Mix them, stirring with an wooden rod for a quarter of an hour; then after the tar has subsided, strain the liquor and keep it in well closed vessels.

The water dissolves the empyreumatic acetic acid with a little of the oil of the tar, and from this impregnation acquires colour, smell and taste. Tar water was at one time highly celebrated for its efficacy in many diseases, being drunk to the extent of a pound or two daily: it operates slightly as a diuretic and diaphoretic, but has long fallen into disuse.

## CHAP. VII.

### INFUSA.—INFUSIONS.

INFUSION is a general term, which might be applied to that process by which the soluble parts of any solid are extracted by the action of any fluid kept in contact for some time with the body on which it acts. In Pharmacy it is usually limited to that case where the active matter of vegetable substances is extracted partially or completely by water, though it is sometimes extended to the same process where other liquors, as alcohol, are employed. It is in the former sense, or as denoting an aqueous preparation, that the term is used in the Pharmacopœias. Infusions therefore are solutions of vegetable matter in water obtained by maceration.

Several of the proximate principles of vegetables being soluble in water, they can often, by this operation, be extracted with advantage. But there are others with regard to which it is altogether useless. Thus the purgative quality of rhubarb is extracted by infusion in water: even the cathartic power of senna, though it appears to reside in a principle more peculiarly soluble in alcohol, is still obtained by the action of water, when a large quantity is employed, and its solvent power is promoted by heat. But the power of jalap is scarcely procured, the watery infusion of it being comparatively weak. In prescribing infusions, therefore, regard must always be had to the composition of the substances ordered to be infused. In general, mucilaginous plants yield their mucilage readily to water: bitterness and astringency are also usually extracted by water with facility, and the aromatic quality where this resides in an essential oil. With regard to other properties, scarcely any general rule can be delivered. To any resinous substance infusion can never properly be applied.

The quantity and quality of the matter extracted by infusion, are considerably varied by the temperature of the fluid. Infusions made with warm water are considerably stronger than those made with cold water; in some cases, however, especially with respect to bitters, they are less grateful. In the infusion of gentian, therefore, of the Edinburgh Pharmacopœia, which is designed to be used as a bitter, cold water is directed to be used; in all the others, boiling water is ordered to be poured on the materials of the infusion, and the vessel is generally placed near a fire.

It is rather singular, that dried vegetables yield their virtues to water by infusion, more readily than when they are in the recent state, probably from the vegetable matter being more easily penetrated by the water.

Infusions are always injured by keeping. Though at first transparent, they soon become more or less turbid; they deposite a mucous-like substance; lose their peculiar taste, and after some time acquire a putrid smell,—changes owing to the gradual decomposition of the vegetable matter they hold dissolved. Infusions are therefore never kept ready prepared in the shops; they are to be regarded as extemporaneous preparations, which, in general, require several hours before they can be prepared.

INFUSUM CINCHONÆ OFFICINALIS. Infusion of Peruvian bark. Ed.

Take of Peruvian Bark in powder, one ounce; Water, one pound. Macerate them for twenty-four hours, and strain.

INFUSUM CINCHONAE. Infusion of Peruvian Bark. Lond.

Take of Peruvian Bark, bruised, half an ounce; Boiling Water, a pint. Macerate for two hours in a vessel lightly closed, and strain.

INFUSUM CINCHONÆ SINE CALORE. Infusion of Peruvian Bark without heat. Dub.

Take of Peruvian Bark in coarse powder, an ounce; Cold Water, twelve ounces, by measure. Rub the bark with a little water, and add the remainder during the rubbing; then macerate for twenty-four hours, shaking occasionally, and pour off the pure liquor.

By infusion, water is capable of dissolving only a small portion of the active matter of cinchona, and the preparation therefore cannot be employed with advantage in any case in which the full operation of the remedy is required. It is used as a bitter in dyspepsia, in a dose of two ounces occasionally, but is seldom prescribed.

INFUSUM DIGITALIS PURPUREÆ. Infusion of Foxglove. Ed.

Take of the dried leaves of Foxglove, one drachm; Boiling Water, eight ounces; Spirit of Cinnamon, one ounce. Macerate for four hours, and strain.

INFUSUM DIGITALIS. Infusion of Foxglove. Lond.

Take of the dried leaves of Foxglove, one drachm; Boiling Water, half a pint. Macerate for four hours in a vessel lightly closed, and strain; then add of Spirit of Cinnamon, half a fluidounce.

Infusion is the form under which Dr Withering, who introduced the use of digitalis in dropsy, recommended it to be given, and it is on the whole the best form, with the view at least to obtain its diuretic operation. The above is the formula of Withering; the addition of the aromatic is designed to counteract the nauseating effect. Its dose is an ounce taken twice a-day, and continued until the effects of the remedy appear.

INFUSUM GENTIANÆ LUTEÆ COMPOSITUM, *vulgo Infusum Amarum.* Compound Infusion of Gentian. Ed.

Take of Gentian Root cut, half an ounce; Dried Orange-Peel bruised, one drachm: Coriander Seeds bruised, half a drachm; Diluted Alkohol, four ounces; Water, one pound. First pour on the alkohol, and after three hours the water; then macerate without heat for twelve hours, and strain.

INFUSUM GENTIANÆ COMPOSITUM. Compound Infusion of Gentian. Lond.

Take of Gentian Root cut, Orange-Peel dried, of each, a drachm; Fresh Lemon-Peel, two drachms; Boiling Water, twelve fluidounces. Macerate for an hour, in a vessel lightly closed, and strain.

INFUSUM GENTIANÆ COMPOSITUM. Compound Infusion of Gentian. Dub.

Take of Gentian Root bruised, two drachms; Fresh Lemon-Peel, half an ounce; dried Orange-Peel, a drachm and a half; Proof Spirit, four ounces; Boiling Water, twelve ounces. Pour on first the spirit, and after three hours, the water; macerate for two days and strain.

This bitter infusion is employed in dyspepsia: a sufficient quantity of alkohol is added to aid the solvent power of the water, and to preserve the infusion from spontaneous decomposition, while there is not so much as to give spiritous pungency. It is therefore better adapted to continued use than the bitter tinctures. Its dose is two ounces occasionally. The London College omit the alkohol; and in an infusion which may always be extemporaneously prepared, and does not therefore require to be long kept, this is perhaps preferable, as avoiding the pernicious consequences arising from the stomach being accustomed to the stimulus of ardent spirit.

INFUSUM MIMOSÆ CATECHU, *vulgo Infusum Japonicum.* Infusion of Catechu. Ed.

Take of Extract of Catechu in powder, two drachms and a half; Bark of Cinnamon bruised, half a drachm; Boiling Water, seven ounces; Simple Syrup, one ounce. Macerate the extract and bark with the water in a closed vessel, for two hours, then strain, and add the syrup.

INFUSUM CATECHU. Infusion of Catechu. Lond.

Take of Extract of Catechu, two drachms and a half; Cinnamon Bark bruised, half a drachm; Boiling Water, half a pint. Macerate for an hour in a vessel lightly closed, and strain.

The Extract of Catechu is entirely soluble in water. This preparation, therefore, possesses all its virtues unimpaired, and rendered more grateful, by the addition of the cinnamon. Hence it is one of the best forms under which catechu can be prescribed. Its principal use is in diarrhœa: its dose, one ounce every third or fourth hour. A small quantity of tincture of opium is frequently added to it with advantage.

INFUSUM RHEI PALMATI. Infusion of Rhubarb. Ed.

Take of the Root of Rhubarb bruised, half an ounce; Boiling Water, eight ounces; Spirit of Cinnamon, one ounce. Macerate the root with the water in a closed vessel for twelve hours, then, adding the spirit, strain the liquor.

INFUSUM RHEI. Infusion of Rhubarb. Lond.

Take of Root of Rhubarb cut, a drachm; Boiling Water, half a pint. Macerate for two hours in a vessel lightly closed, and strain.

The infusion of rhubarb is supposed to have more of the purgative than of the astringent power. It is accordingly used as a mild cathartic, in a dose of two or three ounces. There appears to be an unnecessary waste of rhubarb in the formula of the Edinburgh Pharmacopœia; and that in the London Pharmacopœia, in which only a drachm of rhubarb is ordered to eight ounces of water, is preferable, as this will probably afford as much active matter as the water can dissolve, or at least will give an infusion sufficiently strong. If necessary a larger dose of it may be given.

INFUSUM ROSÆ GALLICÆ. Infusion of Red Rose. Ed.

Take of the Dried Petals of the Red Rose, two ounces; Boiling Water, five pounds; Sulphuric Acid, one drachm; Refined Sugar, two ounces. Macerate the petals with the boiling water in an earthen vessel, which is not glazed with lead, for four hours; then, having poured on the acid, strain the liquor, and add the sugar.

INFUSUM ROSÆ. Infusion of Rose. Lond.

Take of the Dried Petals of the Red Rose, half an ounce; Boiling Water, two pints and a half; Diluted Sulphuric Acid, three fluiddrachms; Refined Sugar, an ounce and a half. Pour the water on the petals in a close glass vessel; then, having dropt in the acid, macerate for half an hour. Lastly, strain the liquor, and add the sugar to it.

INFUSUM ROSÆ. Infusion of Rose. Dub.

Take of the Dried Petals of the Red Rose, freed from the heels, half an ounce; Diluted Sulphuric Acid, by weight, three drachms; Boiling Water, three pounds; Refined Sugar, an ounce and a half. Pour first the water on the petals in a glass vessel; then add the acid, and digest for half an hour, strain the cold liquor, and add the sugar.

This infusion is used principally as a moderately astringent gargle, in slight cases of cynanche, or to check salivation. It owes little else than colour, and a pleasant flavour, to the petals of the rose; the astringency depending almost entirely on the sulphuric acid.

INFUSUM TAMARINDI INDICÆ CUM CASSIA SENNÆ. Infusion of Tamarind and Senna. Ed.

Take of the Prepared Fruit of the Tamarind, one ounce; Senna Leaves, one drachm; Coriander Seeds, half a drachm; Unrefined Sugar, half an ounce; Boiling Water, eight ounces. Macerate them in a close earthen vessel, which is not glazed with lead, shaking frequently, and after four hours strain the liquor. It may be made also with double or triple the quantity of senna.

**INFUSUM SENNÆ CUM TAMARINDIS.** Infusion of Senna with Tamarinds. Dub.

This infusion is prepared in the same manner as the simple infusion of senna, *(to be immediately noticed)*, adding only an ounce of tamarinds before the affusion of the water.

This combination affords a very pleasant purgative, mild in its operation, and not liable to excite nausea. The whole quantity may be taken at intervals as a dose. If a more powerful cathartic is indicated, it may be made with an increased proportion of senna. The direction of not infusing the materials in a vessel glazed with lead, ought to be attended to, as the acid of the tamarinds acting on the lead, the infusion might receive a noxious impregnation.

THERE are some Infusions peculiar to the London and Dublin Pharmacopœias.

**INFUSUM ANTHEMIDIS.** Infusion of Chamomile. Lond.

Take of Flowers of Chamomile, two drachms; Boiling Water, half a pint. Macerate for ten minutes in a vessel lightly closed, and strain.

Under the form of infusion, chamomile is used as a bitter in dyspepsia: it is more grateful when prepared with cold water, and is then equal perhaps in efficacy to any other bitter. The infusion in warm water is generally employed to promote the operation of an emetic.

INFUSUM ARMORACIÆ COMPOSITUM. Compound Infusion of Horse-Radish. Lond.

Take of Fresh Horse-Radish Root cut, Mustard Seed bruised, of each one ounce; Boiling Water, a pint. Macerate for two hours in a vessel lightly closed, and strain; then add, of Compound Spirit of Horse-Radish, a fluidounce.

Under this form the horse-radish may be prescribed in the diseases in which it is employed, more particularly as a stimulant in chronic rheumatism, paralysis, and some forms of dropsy. Its dose is two ounces twice a-day.

INFUSUM AURANTII COMPOSITUM. Compound Infusion of Orange-Peel. Lond.

Take of dried Rhind of the Orange, two drachms; of Fresh Rhind of Lemon, one drachm; of Cloves Bruised, half a drachm; Boiling Water, half a pint. Macerate for a quarter of an hour in a vessel lightly closed, and strain.

This affords a bitter, grateful, and somewhat pungent, which may be employed with advantage in some forms of dyspepsia. Its dose is two ounces.

INFUSUM CALUMBÆ. Infusion of Colombo. Lond.

Take of Colombo Root cut, one drachm; Boiling Water, half a pint. Macerate for two hours in a vessel lightly closed, and strain.

The active matter of colombo is rather imperfectly extracted by water; and this can be regarded only as a bitter infusion, which, like other bitters, may be used in dyspeptic affections. Its dose is two ounces. To obtain the more active operation of colombo, it must be given in substance.

INFUSUM CARYOPHYLLORUM. Infusion of Cloves. Lond.

Take of Bruised Cloves, a drachm; Boiling Water, half a pint. Macerate for two hours in a vessel lightly closed, and strain.

The aromatic odour and pungency of the clove are extracted in this infusion: it may be used with advantage as a warm and grateful stimulant in some forms of dyspeptic affection, where a sensation of cold and uneasiness is felt at the stomach,—a state which is often produced where the habit of taking spiritous cordials has been indulged in. Its dose is a wine glassful.

INFUSUM CASCARILLÆ. Infusion of Cascarilla. Lond.

Take of Cascarilla Bark bruised, half an ounce; Boiling Water half a pint. Macerate for two hours in a vessel lightly closed, and strain.

Cascarilla is a substance little valued in modern practice, and there does not appear to be much propriety in the introduction of this infusion as an officinal preparation. Its dose is two ounces.

INFUSUM CUSPARIÆ. Infusion of Angustura. Lond.

Take of the Bark of Angustura, bruised, two drachms; Boiling Water, half a pint. Macerate for two hours, in a vessel lightly closed, and strain.

The same remark nearly applies to this preparation, as to the preceding one. Under this form, however, angustura may be occasionally used as a remedy in dyspepsia. The dose is two ounces.

INFUSUM LINI. Infusion of Lintseed. Lond.

Take of Lintseed bruised, one ounce; Liquorice Root cut, half an ounce; Boiling Water, two pints. Macerate for four hours, nigh the fire, in a vessel lightly closed, and strain.

The mucilaginous matter of lintseed is very readily dissolved by tepid water; and this forms a demulcent liquor, often taken with advantage in gonorrhœa, dysuria, and sometimes in catarrh. It is rendered rather more grateful by the addition of a small portion of lemon juice, and of the rhind of the lemon, with a little sugar.

INFUSUM QUASSIÆ. Infusion of Quassia. Lond.

Take of the Wood of Quassia cut, one scruple; Boiling Water, half a pint. Macerate for two hours, in a vessel lightly closed, and strain.

Quassia is a very pure bitter, and its bitterness is extracted by water. Under this form it is used as a remedy in dyspepsia. Its dose may be two ounces.

INFUSUM SENNÆ. Infusion of Senna. Lond.

Take of Senna Leaves, an ounce and a half; Ginger, one drachm; Boiling Water, a pint. Macerate for an hour in a vessel lightly closed, and strain the liquor.

INFUSUM SENNÆ. Infusion of Senna. Dub.

Take of Senna Leaves, three drachms; Lesser Cardamom Seeds, freed from the capsules and bruised, half a drachm; Boiling Water, as much as that six ounces by measure may be strained off. Digest for an hour, and when the liquor has cooled, strain it.

Under this form, senna may be given as a purgative, the dose being three or four ounces. It is however less grateful than the infusion of senna and tamarinds of the Edinburgh Pharmacopœia. The proportion of senna, in the London formula, appears to be considerably greater than what is necessary; and there is no propriety in preparing more of the infusion than what is required for a dose, as it suffers decomposition in a very short time.

INFUSUM SIMAROUBÆ. Infusion of Simarouba. Lond.

Take of the Bark of Simarouba bruised, half a drachm; Boiling Water, half a pint. Macerate for two hours, in a vessel lightly closed, and strain.

Simarouba yields its bitterness to water; the infusion, however, is inferior to that of quassia, and does not appear to have any particular advantage to recommend it.

INFUSUM TABACI. Infusion of Tobacco. Lond.

Take of the Leaves of Tobacco, one drachm; Boiling Water, a pint. Macerate for an hour, in a vessel lightly closed, and strain.

This infusion is prepared of that strength, which is proper for giving tobacco under the form of enema, as a narcotic in incarcerated hernia, or to produce evacuation from the intestines, in ileus and obstinate constipation.

INFUSUM MENTHÆ COMPOSITUM. Compound Infusion of Mint. Dub.

Take of the Leaves of Spearmint dried, two drachms; Boiling Water, as much as is sufficient to afford six ounces of infusion when strained. Digest for half an hour in a covered vessel; strain the liquor when cold, and add to it, of Refined Sugar, two drachms; Oil of Spearmint, three drops, dissolved in half an ounce of compound tincture of cardamom.

This is a grateful stomachic, which may be used to obviate flatulence, or as a vehicle to cover the taste of unpleasant medicines.

INFUSUM VALERIANÆ. Infusion of Valerian. Dub.

Take of the Root of Valerian, in coarse powder, two drachms; Boiling Water, seven ounces. Digest for an hour, and strain the liquor when it is cold.

Valerian is frequently taken in hysteric affections under the form of infusion, and this will afford a preparation of proper strength. Its dose is from one to two ounces.

## CHAP. VIII.

### OF MUCILAGES.

THE term Mucilage, understood as denoting a particular preparation in Pharmacy, is applied to solutions of gummy matter in water, sufficiently concentrated to have a certain degree of viscidity; or to similar solutions obtained by the maceration of water on vegetables, in which this kind of matter abounds. They are principally employed as vehicles for other substances, either to suspend powders in liquids, to diffuse oils or resinous matter in water, or to give form and tenacity to pills.

MUCILAGO AMYLI. Starch Mucilage. Ed.

Take of Starch, half an ounce; Water, one pound. Rub the starch, with the water gradually added to it, then boil them for a short time.

MUCILAGO AMYLI. Lond.

Take of Starch, three drachms; Water, a pint. Rub the starch with a little of the water dropt upon it; then boil, until it form a mucilage.

MUCILAGO AMYLI. Starch Mucilage. Dub.

Take of Starch, half an ounce; Water, a Pint. Rub the starch, adding the water gradually; then boil a little.

Starch is the fecula of wheat, and though insoluble in cold water, is dissolved by boiling water, and forms a gelatinous solution. This starch-mucilage is used as a vehicle for giving opium under the form of enema.

MUCILAGO ASTRAGALI TRAGACANTHÆ. Mucilage of Gum Tragacanth. Ed.

Take of Gum Tragacanth beat to powder, one ounce; Boiling Water, eight ounces. Macerate for twenty-four hours, and rub the gum carefully, that it may be dissolved; then strain through linen.

MUCILAGO GUMMI TRAGACANTHÆ. Dub.

Take of Gum Tragacanth in powder, two drachms; Water, eight ounces. Macerate in a close vessel until the gum is dissolved; then strain the mucilage through linen.

Tragacanth is not easily dissolved in water, and, even with the aid of heat, the viscid mucilaginous liquor that is formed remains turbid and flocculent. The proportion of the gum to the water is rather large in the Edinburgh Pharmacopœia, but is designed to form a stiff mucilage, to be used principally in making troches.

MUCILAGO MIMOSÆ NILOTICÆ. Mucilage of Gum Arabic. Ed.

Take of Gum Arabic in powder, one part; Boiling Water, two parts. Digest with frequent agitation until the gum be dissolved; then strain through linen.

MUCILAGO ACACIÆ. Mucilage of Gum Arabic. Lond.

Take of Gum Arabic in powder, four ounces; Boiling Water, half a pint. Rub the gum with the water, gradually added until it form a mucilage.

MUCILAGO GUMMI ARABICI. Mucilage of Gum Arabic. Dub.

Take of Gum Arabic in coarse powder, four ounces; Boiling Water, eight ounces. Digest them, agitating frequently, so as to dissolve the gum; then strain through linen.

Mucilage of gum Arabic is sometimes employed as the basis of the common demulcent mixtures used in catarrh. It is more generally used as an agent in Pharmacy, to suspend in water substances insoluble in that liquid, to diffuse oils in water, and for similar purposes.

## CHAP. IX.

### OF DECOCTIONS.

THE power of water as a solvent, is, like that of all other chemical agents, increased by heat. Hence, in general, the active matter of vegetable substances is more completely extracted by boiling them with water, than by mere infusion, either cold or warm, the residuum in the one case being found more inert than in the other.

It is not to be concluded, however, from this fact, that the decoction is proportionally more powerful in medicinal operation. On the contrary, though the active matter of

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the substance is more completely extracted, it is often much injured in the operation: in few cases is the decoction equal in power to the quantity of the substance from which it is prepared; in many it is much impaired; and in some it is totally lost, the decoction itself and the residual matter being both nearly inert.

This change is often owing to the dissipation of the volatile principles of the substance operated on. All the essential oils are volatilized at the temperature of boiling water. It is evident, therefore, that substances, whose virtues depend wholly or in part on their essential oil, must be injured by this operation: for this reason, aromatics are always useless additions to decoctions; and the aromatic flavour of many active substances is also lost in this form of preparation.

But there are many cases in which the virtues of medicines are injured by decoction, in which we cannot ascribe the injury to the mere dissipation of their active principles. The powers of opium, cinchona, and ipecacuan, for example, are much weakened by boiling in water; yet, when the operation is conducted in close vessels, so as to collect the water that is evaporated, that water is not found to be strongly impregnated with the active matter of the substance operated on. The distilled water of opium has been given to the extent of six ounces, without exerting any great narcotic effect; and the distilled water of ipecacuan, though it proves emetic, is much less so than the simple infusion. Since, then, the active matter is neither to be found in the fluid which is evaporated, nor in that which remains, it is evident that it must have been destroyed in the operation, by decomposition of the principles on which it depends. It is accordingly found that some such change is induced. When a decoction is strained, so as to be obtained transparent, and is subjected anew to boiling, it acquires a deeper colour, becomes turbid, an insipid substance being gradually formed, which is deposited. This change may be owing, either to the re-action of the elements of the vegetable matter being favoured by the humidity, and the high temperature, so that they enter into new combinations, or to the action of the air upon it imparting oxygen. There have been experiments brought in proof of this last circumstance taking place in some cases, especially in the decoction of Peruvian bark, oxygen being absorbed, combining with the extracto-resinous matter, and forming an insipid substance. This in particular is affirmed by Fourcroy. And it is farther rendered probable by the experiments of the younger Saussure, who found that extractive matter, in a humid or dissolved state, exposed to the air, was precipitated after a few days in an insoluble state; oxygen was absorbed; carbonic acid was also formed; and he concluded from the results he obtained, that, while part of the carbon of the vegetable matter is abstracted by the action of the oxygen of the air, part also of its oxygen and hydrogen combine and form water, so that the residual matter has an increased proportion of carbon, and its composition is thus totally changed. These changes will be favoured by a high temperature: they are those, therefore, probably that take place in decoction, and impair or destroy the powers of the vegetable substance; though it is also possible, that chemical changes may arise from the re-action of the elements of the vegetable matter itself, independent of any action of the air.

From these observations, it is evident, that decoction can seldom be a proper form for the administration of medicines. The pungency and aromatic flavour, on which part of their virtues depend, and which render them at least more grateful, must always be impaired or lost, and their more important virtues must often be equally injured. It is accordingly a form which is not now often applied to active remedies.

Decoctions, like infusions, are extemporaneous prescriptions. They cannot be kept ready prepared, as in a few days they become turbid, and run into the acetous fermentation. They can be prepared, however, much sooner than infusions; the boiling not requiring to be continued in general for more than ten or fifteen minutes. While the boiling continues the air ought to be excluded by covering the vessel; and in general it ought not to be continued long. The liquor ought to be strained while hot, as, on cooling, a portion of the dissolved matter is frequently deposited, which is as active as that which remains dissolved, and this precipitate ought to be mingled with the liquid by agitation, when the dose is to be taken.

DECOCTUM ALTHÆÆ OFFICINALIS. Decoction of Althæa. Ed.

Take of Dried Althæa Root bruised, four ounces; Raisins freed from their seeds, two ounces; Water, seven pounds. Boil to five pounds; put aside the strained liquor until the impurities have subsided, and pour off the clear liquor.

The gummy part of vegetables is less injured by decoction than any other. In this decoction, therefore, all the powers of the althæa root are obtained, and it is under this form that it is used. The decoction is taken as a demulcent, to the extent of two or three pounds in the day, in nephritic complaints, in ardor urinæ, and sometimes in catarrh.

DECOCTUM ANTHEMIDIS NOBILIS, *vulgo Decoctum Chamæmeli sive Commune.* Decoction of Chamomile, *or Common Decoction.* Ed.

Take of the Dried Flowers of Chamomile, one ounce; Caraway Seeds bruised, half an ounce; Water, five pounds. Boil for a quarter of an hour, and strain.

DECOCTUM CHAMÆMELI COMPOSITUM. Compound Decoction of Chamomile. Dub.

Take of Chamomile Flowers dried, half an ounce; Sweet Fennel Seeds, two drachms; Water, one pint. Boil a little and strain.

These decoctions are used only as an enema, and as a fomentation. When applied to the former purpose, the effect is to be ascribed principally to the water; in the second, the vegetables are not more useful, except as retaining longer the heat and moisture when applied to a part. The decoction of the Dublin Pharmacopœia is rendered more active as an enema, by dissolving in ten ounces of it an ounce of manna, and half an ounce of sulphate of magnesia, adding an ounce of olive oil. It then forms what is named ENEMA CATHARTICUM. When to this are added two drachms of tincture of assafœtida, it forms the preparation of the same Pharmacopœia named ENEMA FOETIDUM.

DECOCTUM CINCHONÆ OFFICINALIS, *vulgo Decoctum Corticis Peruviani.* Decoction of Peruvian Bark. Ed.

Take of Peruvian Bark in powder, one ounce; Water, one pound and a half. Boil for ten minutes in a covered vessel, and strain the liquor while hot.

DECOCTUM CINCHONÆ. Decoction of Peruvian Bark. Lond.

Take of Peruvian Bark bruised, an ounce; Water, a pint. Boil for ten minutes in a vessel lightly closed, and strain the liquor while warm.

DECOCTUM CORTICIS CINCHONÆ. Decoction of Peruvian Bark. Dub.

Take of Peruvian Bark in coarse powder, an ounce; Water, a pint. Boil for ten minutes in a vessel nearly close, and strain the liquor while warm through linen.

The resino-extractive matter of Peruvian bark appears to be decomposed by decoction; hence the reason of the directions given in the Pharmacopœia under this preparation,—the boiling not being continued longer than ten minutes, as in this time the active matter, it is supposed, will be as fully extracted as it would be by longer boiling, and the decoction being performed in a covered vessel to exclude as much as possible the access of the air, to the chemical agency of which the change in the extractive matter has been supposed owing. The liquor is ordered to be strained while hot, as it holds dissolved a larger portion of the resinous matter than it can retain in solution when cold. Hence, after having been strained, it becomes turbid as it cools, depositing a reddish precipitate. This ought to be mixed with it by agitation when the dose is to be taken. The addition of a little acid causes it to remain dissolved, and where this can be prescribed with propriety it may be employed.

Decoction of bark is used in those cases which require the free administration of the remedy, but in which in substance it sits uneasy on the stomach. The dose is two or three ounces, taken as often as the stomach will receive it.

DECOCTUM DAPHNES MEZEREI. Decoction of Mezereon. Ed.

Take of the Bark of the Root of Mezereon, two drachms; of Liquorice Root bruised, half an ounce; Water, three pounds. Boil with a gentle heat to two pounds, and strain.

A compound decoction, prepared from guaiac wood, sarsaparilla, sassafras, mezereon and liquorice, had been highly celebrated, under the name of Lisbon Diet Drink, for its efficacy in the treatment of symptoms connected with syphilis, particularly thickening of the ligaments, affections of the bones and periosteum, and obstinate ulceration. Dr Russel, from a series of experiments, concluded, that the mezereon is the ingredient on which its activity depends; and this decoction, in which the liquorice serves to cover the pungency of the mezereon, has been substituted for the more complicated composition. It is used in the same cases; sometimes also in cutaneous affections, particularly lepra, and in chronic rheumatism. According to Mr Pearson's experience of it, it has little efficacy in removing the syphilitic symptoms for which it is usually prescribed. Its dose is from four to six ounces twice or thrice a-day. In a large dose, it is liable to excite nausea.

DECOCTUM GEOFFRÆÆ INERMIS. Decoction of Cabbage-Tree Bark. Ed.

Take of Cabbage-Tree Bark in powder, one ounce; Water, two pounds. Boil with a gentle heat to one pound, and strain.

This decoction is the form under which this medicine has been usually administered, the bark in substance being too violent in its operation. In the West India Islands, the decoction has been used as a very effectual remedy in worms, especially the lumbrici. The dose given is two ounces to an adult; if this occasion nausea, griping, or tenesmus, which it sometimes does, especially it is affirmed if cold water is drunk freely during its operation, these symptoms are relieved by a dose of castor oil. In this country it has not been much employed.

**Decoctum guajaci officinalis compositum**, *vulgo Decoctum Lignorum.* Compound Decoction of Guaiac. Ed.

Take of Guaiac Wood Shavings, three ounces; Raisins, two ounces; Sassafras Root cut, Liquorice Root bruised, of each one ounce; Water, ten pounds. Boil the water with the guaiac wood and raisins, on a gentle fire, to five pounds, adding the roots towards the end of the boiling; then strain without expression.

This decoction derives its virtues principally from the guaiac. It acts as a diaphoretic, and has been used in cutaneous diseases, and in chronic rheumatism, taken in the quantity of a pound twice or thrice a-day. It has also been employed in the treatment of obstinate venereal symptoms, especially as an auxiliary to mercury.

**Decoctum hordei distichi.** Decoction of Barley. Ed.

Take of Pearl Barley, two ounces; Water, five pounds. First wash off with cold water the flour adhering to the barley; then boil the barley for a short time with about half a pound of water, to extract the colouring matter. This being rejected, put the barley thus purified into five pounds of boiling water. Boil this to one half, and strain.

**Decoctum hordei.** Decoction of Barley. Lond.

Take of the Seeds of Barley, two ounces; Water, four pints and a half. First wash off the impurities adhering to the barley with cold water, then pouring on half a pint of water, boil the seeds a little; this water being rejected, pour on the remaining water previously heated; then boil to two pints, and strain.

**Decoctum hordei.** Decoction of Barley. Dub.

Take of Pearl Barley, two ounces. Having first cleansed the barley with cold water, boil it in about half a pint of water for a little. The liquor being rejected, put the barley into five pints of boiling water; then boil until the half of the water has been evaporated, and strain.

This decoction is never prepared in the shops. It is, however, very extensively used as a diluent in febrile diseases; and as it is of some importance that it should be grateful, it has been judged proper to give directions how it may be best prepared.

Decoctum hordei compositum. Compound Decoction of Barley. Lond.

Take of Decoction of Barley, two pints; Figs cut, two ounces; Liquorice Root cut and bruised, half an ounce; Raisins freed from the seeds, two ounces; Water, a pint. Boil to two pints, and strain.

Decoctum hordei compositum. Compound Decoction of Barley. Dub.

Take of Decoction of Barley, four pints; Raisins freed from the seeds, Figs cut, of each two ounces; Liquorice cut and bruised, half an ounce. During the boiling, add first the raisins, then the figs, and lastly the liquorice, a little before the end of the boiling, which will be complete when of the liquor about two pints remain.

The additions in these compound decoctions can communicate little efficacy, and probably render the liquor rather cloying to the taste and stomach.

Decoctum polygalæ senegæ. Decoction of Seneka. Ed.

Take of Seneka Root, one ounce; Water, two pounds. Boil to sixteen ounces, and strain.

Decoctum senegæ. Decoction of Seneka. Lond.

Take of Seneka Root, an ounce; Water, two pints. Boil to a pint and strain.

Under the form of decoction, senega has been employed as an expectorant in pneumonic affections, attended with accumulation of mucus in the bronchiæ, and as a diaphoretic in chronic rheumatism. The dose is two or three ounces three or four times a-day.

DECOCTUM SMILACIS SARSAPARILLÆ. Decoction of Sarsaparilla. Ed.

Take of Sarsaparilla Root cut, six ounces; Water, eight pounds. Digest for two hours, in a temperature of about 195°, then take out the root and bruise it; put it again into the liquor, and boil it with a gentle fire to two pounds; then express it, and strain.

DECOCTUM SARSAPARILLÆ. Decoction of Sarsaparilla. Lond.

Take of Sarsaparilla Root cut, four ounces; Boiling Water, four pints. Macerate for four hours in a vessel lightly closed, nigh the fire, then cut and bruise the sarsaparilla; return it bruised into the liquor, and again macerate in a similar manner for two hours; lastly, boil to two pints, and strain.

DECOCTUM SARSAPARILLÆ. Decoction of Sarsaparilla. Dub.

Take of Sarsaparilla Root cut, an ounce and a half; Boiling Water, two pints. Digest for two hours in a medium heat, (between 100 and 200°), then take out the sarsaparilla and bruise it; return it bruised into the liquor, and again digest for two hours; lastly, let the liquor, after the half of it has been consumed by boiling, be expressed, and strained through linen.

The fecula, which is the principle in which the power of sarsaparilla resides, is not easily extracted merely by boiling the root. This is the reason of the particular directions to digest the root first, and then bruise it; it is thus softened, and yields its soluble matter more readily in the subsequent boiling. This decoction is the form under which sarsaparilla is always given, its dose being from a pint to a quart in the course of the day. It has been used in venereal cases, either to promote the action of mercury, or to remove symptoms which have remained after a long continued mercurial course. Dr Fordyce celebrated its efficacy in very high terms, in giving relief in nocturnal pains, removing eruptions, and as being the best restorative in the emaciation and debility remaining after the long continued use of mercury. Its efficacy has however probably been overrated, and the opinion is perhaps more just which regards it only as belonging to the nutrientia, or as a demulcent. The benefit sometimes derived during its use has as frequently arisen from the exhibition of mercury too long continued having been suspended, as from any action of the sarsaparilla itself. The decoction has been used with considerable advantage as a demulcent in dysuria and morbid irritability of the bladder, occasioning incontinence of urine.

A FEW Decoctions, peculiar to the London and Dublin Pharmacopœias, remain to be noticed.

DECOCTUM ALOES COMPOSITUM. Compound Decoction of Aloes. Lond.

Take of Extract of Liquorice, half an ounce; Sub-carbonate of Potash, two scruples; Extract of Aloes, Myrrh in powder, Saffron, of each one drachm; Water, a pint. Boil down to twelve fluidounces, and strain; then add of Compound Tincture of Cardamoms, four fluidounces.

The gum-resinous substances in this decoction are retained in solution, partly by the solvent power of the water, and partly by the action of the alkali; and by the addition of the spiritous tincture, any spontaneous decomposition will be more effectually prevented. The composition is newly introduced into the Pharmacopœia, and is said to be analogous to one formerly in use, under the name of Baume de Vie. It is one which must be very nauseous, and it is not obvious what peculiar advantage can belong to it. As a stimulating aperient, it may be given in the dose of two ounces.

DECOCTUM CYDONIÆ. Decoction of Quince Seeds. Lond.

Take of Quince Seeds, two drachms; Water, a pint. Boil with a gentle heat for ten minutes, then strain.

Quince seeds abound with mucilage, which is extracted easily by boiling in water. It is liable to spontaneous decomposition, and having no peculiar advantage, is little employed.

DECOCTUM DULCAMARÆ. Decoction of Woody Nightshade. Lond.

Take of the Stalks of Woody Nightshade cut, one ounce; Water, a pint and a half. Boil to a pint, and strain.

Under this form the woody nightshade may be employed; but there seems no propriety in giving a formula for its preparation, more than any other vegetable substance, which may be given under the same or any similar form.

DECOCTUM LICHENIS. Decoction of Iceland Liverwort. Lond.

Take of Liverwort, one ounce; Water, a pint and a half. Boil down to one pint, and strain.

DECOCTUM LICHENIS ISLANDICI. Decoction of Iceland Liverwort. Dub.

Take of Iceland Liverwort, half an ounce; Boiling Water, a pint. Digest for two hours in a close vessel, then boil for a quarter of an hour, and strain the liquor while warm.

The fecula or mucilage of the lichen is extracted by water by boiling, and it is under this form of decoction that it has been employed as a demulcent, and a mild nutritious substance easy of digestion. It may be rendered more grateful by removing the bitter matter of the lichen, by previous maceration.

DECOCTUM MALVÆ COMPOSITUM. Compound Decoction of Mallow. Lond.

Take of Mallow dried, an ounce; Chamomile Flowers, dried, half an ounce; Water, a pint. Boil them for a quarter of an hour, and strain.

This decoction is designed for the same purpose as the decoction of chamomile, that of serving as a vehicle for fomentations and enemas; and the same observation applies to it.

DECOCTUM PAPAVERIS. Decoction of Poppy. Lond.

Take of the Capsules of the White Poppy cut, four ounces; Water, four pints. Boil for a quarter of an hour, and strain.

The decoction of the capsules of the poppy has been frequently used as an anodyne fomentation, and is now, with propriety, introduced as an officinal preparation.

DECOCTUM QUERCUS. Decoction of Oak Bark. Lond.

Take of Oak Bark, an ounce; Water, two pints. Boil down to a pint, and strain.

The astringency of the oak bark is extracted by boiling in water; and the decoction is the form under which it is used, externally as a styptic in hæmorrhoids, prolapsus ani, leucorrhœa, and profuse menorrhagia.

DECOCTUM SARSAPARILLÆ COMPOSITUM. Compound Decoction of Sarsaparilla. Lond.

Take of the Simple Decoction of Sarsaparilla boiling, four pints; Sassafras Wood cut, Raspings of Guaiac Wood, Liquorice Root bruised, of each one ounce; Mezereon, three drachms. Boil for a quarter of an hour.

DECOCTUM SARSAPARILLÆ COMPOSITUM. Compound Decoction of Sarsaparilla Dub.

Take of Sarsaparilla Root cut and bruised, an ounce and a half; Shavings of Guaiac Wood, Bark of Sassafras Root, Liquorice bruised, of each two drachms; Bark of Mezereon Root, a drachm; Boiling Water, three pints. Digest the sarsaparilla, guaiac and sassafras in water at a heat between 100 and 200° for six hours; then boil until the half of the water is evaporated, adding towards the end of the boiling the liquorice with the mezereon; lastly, strain.

This is nearly the same composition as the Lisbon Diet Drink, celebrated, as has been already remarked, in the treatment of secondary venereal affections, or symptoms appearing during a protracted mercurial course. The efficacy of the preparation has been supposed to depend principally on the mezereon; the other substances may, however, add something to its power, and it is perhaps preferable to adhere to the original composition of remedies of this kind, so far as this is unexceptionable. Its dose is four or six ounces, three or four times a-day.

DECOCTUM ULMI. Decoction of Elm. Lond.

Take of the Fresh Bark of the Elm bruised, four ounces; Water, four pints. Boil down to two pints, and strain.

DECOCTUM ULMI. Decoction of Elm. Dub.

Take of the interior Fresh Bark of the Elm bruised, two ounces; Water, two pints. Boil to a pint, and strain.

This decoction has been recommended in cutaneous eruptions, but is little used. Its dose is four ounces.

DECOCTUM VERATRI. Decoction of White Hellebore. Lond.

Take of White Hellebore Root beat, an ounce; Water, two pints. Rectified Spirit, two fluidounces. Boil the white hellebore root with the water down to a pint, and strain; when cold, add the spirit.

This decoction is employed as an external application in some cutaneous diseases, principally in psora. It is a much less unpleasant application than the sulphur ointment, and is occasionally successful.

DECOCTUM DIGITALIS. Decoction of Foxglove. Dub.

Take of the Leaves of Foxglove dried, one drachm; Water, as much as may be sufficient to afford eight ounces of strained liquor. Place the vessel on a gentle fire, and remove it when the liquor begins to boil; then digest for a quarter of an hour, and strain.

Water extracts sufficiently the active matter of the leaves of foxglove by infusion, and there is therefore no necessity for boiling it upon them. The decoction in this preparation is, however, so slight, that it cannot alter the powers of the medicine, and it may be regarded as analogous to the infusion of the other Pharmacopœias. The proportions too are the same, and it may therefore be given in the same dose.

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# CHAP. V.

## SYRUPI.—SYRUPS.

Syrups are saturated solutions of sugar in water, in watery infusions, or in vegetable juices. They are seldom active medicines; and are more commonly employed to render others agreeable, and in pharmacy to communicate peculiar forms.

The proportion of sugar in syrups is generally two parts to one of the fluid; if it is more than this, the solution is disposed to crystallize; if less, it is liable to ferment, and become acescent. Refined sugar ought always to be employed. It is to be melted in the liquid by a gentle heat, and any impurities which collect on its surface when boiling are to be removed. The syrup ought to be kept in a cool place, to prevent the fermentation, which is favoured by a high temperature. The London College order them to be kept at a temperature not higher than 55°. The Dublin College give the general formula with regard to the preparation of all the syrups which they prescribe, that "twenty-nine ounces of refined sugar in powder, and a pint of the prescribed liquor are to be digested with a moderate heat, in a close vessel, stirring frequently, until the sugar is dissolved; the liquor is to be put aside for twenty-four hours, the scum removed, and the syrup poured off from any impurities."

SYRUPUS SIMPLEX *sive communis*. Simple *or Common* Syrup. Ed.

Take of Refined Sugar beat to powder, fifteen parts; Water, eight parts. Dissolve the sugar with a gentle heat, and boil a little so as to form a syrup.

SYRUPUS. Syrup. Lond.

Take of Refined Sugar, two pounds and a half; Water, a pint. Dissolve the sugar in the water in a water bath, put aside for twenty-four hours; then remove the scum, and pour off the clear liquor from any impurities.

This solution of sugar is used merely to communicate sweetness of taste, or for the pharmaceutical purposes to which syrups are applied.

SYRUPUS ACIDI ACETOSI. Syrup of Acetous Acid. Ed.

Take of Acetous Acid (Vinegar,) two pounds and a half; Refined Sugar, three pounds and a half. Boil so as to form a syrup.

This acidulous syrup being sufficiently pleasant, may enter into mixtures in which the acid will not occasion any chemical change. It is, however, so rarely employed, that being liable to decomposition on keeping, it is not found in the shops.

SYRUPUS ALTHÆÆ OFFICINALIS. Syrup of Althæa. Ed.

Take of Fresh Althæa Root cut, one pound; Water, ten pounds; Refined Sugar, four pounds. Boil the water with the root to one half, and expressing it strongly, strain. Put aside the strained liquor, that the impurities may subside, and to the purified liquor add the sugar; then boil it so as to form a syrup.

SYRUPUS ALTHÆÆ. Syrup of Althæa. Lond.

Take of Fresh Althæa Root bruised, half a pound; Refined

Sugar, two pounds ; Water, four pints. Boil the water with the root to one half, and express the cold liquor. Put it aside for twenty-four hours, that the impurities may subside ; then pour off the liquor, and having added the sugar, boil to a proper consistence.

The water dissolving the mucilage of the althæa, less than the usual proportion of sugar is required to give it the consistence of a syrup. This mucilage is supposed to give the syrup some demulcent power; but this must be very trivial, and it renders it more liable to spontaneous decomposition.

SYRUPUS AMOMI ZINGIBERIS. Syrup of Ginger. Ed.

Take of the Root of Ginger beat, three ounces; Boiling Water, four pounds; Refined Sugar, seven pounds and a half. Macerate the root in the water, in a close vessel, for twenty-four hours; and to the strained liquor, add the beat sugar, so as to make a syrup.

SYRUPUS ZINGIBERIS. Syrup of Ginger. Lond.

Take of Ginger Root cut, two ounces; Boiling Water, a pint; Refined Sugar, two pounds. Macerate the ginger in the water for four hours, and strain ; then add the sugar, and form the syrup.

SYRUPUS ZINGIBERIS. Syrup of Ginger. Dub.

Take of Ginger Root bruised, four ounces; Boiling Water, three pints. Macerate for twenty-four hours; then to the strained liquor add the sugar, and form a syrup.

The infusion is impregnated with the flavour and pungency of the ginger, which render it sufficiently grateful, and it affords a cheap aromatic syrup.

SYRUPUS CITRI AURANTII. Syrup of Orange-Peel. Ed.

Take of the Fresh Outer Rhind of the Orange, six ounces; Boiling Water, three pounds; Refined Sugar, four pounds. Macerate the rhind in water for twelve hours; then to the strained liquor add the sugar beat to powder, and, by the application of a gentle heat, form a syrup.

SYRUPUS AURANTII. Syrup of Orange-Peel. Lond.

Take of the Fresh Rhind of the Orange, two ounces; Boiling Water, a pint; Refined Sugar, three pounds. Macerate the rhind in the water for twelve hours, in a vessel lightly closed; then pour off the liquor, and add the sugar to it.

SYRUPUS AURANTII. Syrup of Orange-Peel. Dub.

Take of the Fresh Rhind of the Seville Orange, eight ounces; Boiling Water, six pints. Macerate for twelve hours in a close vessel; then in the strained liquor dissolve sugar to form a syrup.

This syrup, like the former, is used on account of its grateful aromatic flavour. The proportion of sugar in the formula of the Edinburgh Pharmacopœia is too small, especially as it is necessary to avoid any dissipation of the water by boiling, to prevent the loss of the flavour of the orange-peel.

SYRUPUS CITRI MEDICÆ, *olim Syrupus Limonum.* Syrup of Lemon. Ed.

Take of the Juice of Lemons strained, after the impurities have subsided, three parts; Refined Sugar, five parts; dissolve the sugar so as to form a syrup.

SYRUPUS LIMONIS. Syrup of Lemon. Lond.

Take of Lemon Juice, strained, a pint; Refined Sugar, two pounds. Dissolve the sugar in the lemon juice in the manner ordered for preparing syrup.

SYRUPUS LIMONIS. Syrup of Lemon. Dub.

Take of Expressed Lemon Juice, two pints. The impurities having subsided from the juice, put it into a matrass, and heat it by boiling water around it for a quarter of an hour. When cold, pass it through a sieve, and form it into a syrup.

This is a pleasant syrup, used to sweeten and acidulate mixtures, especially those of the mucilaginous kind: there are others, into the composition of which it cannot properly enter, from the chemical agency of the acid.

SYRUPUS COLCHICI AUTUMNALIS. Syrup of Colchicum. Ed.

Take of the Fresh Root of Colchicum, cut into small pieces, one ounce; Acetous Acid, sixteen ounces; Refined Sugar, twenty-six ounces. Macerate the root in the acid for two days, shaking the vessel occasionally; then expressing it gently, strain it; to the strained liquor add the sugar in powder, and boil a little, so as to form a syrup.

Colchicum has been used under this form as a diuretic in dropsy, the dose being from half an ounce to an ounce. The remedy itself being one little employed in modern practice, this syrup is scarcely ever prescribed.

SYRUPUS DIANTHI CARYOPHYLLI. Syrup of Clove July-Flower. Ed.

Take of the Fresh Petals of the Clove July-Flower freed from the heels, one pound; of Boiling Water, four pounds; of Refined Sugar, seven pounds. Macerate the petals in the water for twelve hours; then to the strained liquor add the sugar in powder; which dissolve with a gentle heat, so as to form a syrup.

SYRUPUS CARYOPHYLLI RUBRI. Syrup of Clove July-Flower. Dub.

Take of the Fresh Petals of the Clove July-Flower, freed from the heels, two pounds; Boiling Water, six pints. Macerate for twelve hours in a glass vessel, dissolve the sugar in the strained liquor, so as to form a syrup.

This syrup derives from the flowers a rich red colour, and an agreeable flavour, and from these qualities is frequently used in mixtures.

SYRUPUS PAPAVERIS SOMNIFERI. Syrup of White Poppy. Ed.

Take of the Dried Capsules of the White Poppy, freed from the seeds, two pounds; Boiling Water, thirty pounds; Refined Sugar, four pounds. Macerate the capsules cut, in the water for twelve hours; then boil until a third part only of the liquor remain; and pressing it strongly, strain; boil down the strained liquor to one half, and again strain; lastly, the sugar being added, boil a little, so as to form a syrup.

SYRUPUS PAPAVERIS. Syrup of Poppy. Lond.

Take of the Capsules of the Poppy, dried and bruised, the seeds being removed, fourteen ounces; Refined Sugar, two pounds; Boiling Water, two gallons and a half. Macerate the capsules in water for twelve hours; then boil down the liquor in a water bath to a gallon, and express it strongly; boil it again to two pints, and strain it while hot. Put it aside for twelve hours that the impurities may subside; then boil down the purified liquor to a pint, and add the sugar as ordered for the preparation of syrup.

SYRUPUS PAPAVERIS ALBI. Syrup of White Poppy. Dub.

Take of the Capsules of the White Poppy, gathered before they are ripe, and dried, (the seeds being removed), a pound; Boiling Water, three pints. Cut and bruise the capsules; then pour on them the water, and macerate for twelve hours; express the liquor, and evaporate it by a moderate heat to a pint; strain it through a thin linen cloth, and put it aside for six hours, that the impurities may subside; lastly, having freed the liquor from the impurities, add sugar so as to form a syrup.

The active matter of the capsule of the poppy is extracted by water by decoction, and, by boiling down the liquor, it is obtained in a more concentrated state, whether with any diminution of its powers from the continued decoction has not been ascertained. The syrup has a considerable degree of narcotic power; and the taste being agreeable, and the dose easily regulated, it is more convenient than any preparation of opium for exhibition to children, a drachm being given to a child a year old. From the supposition that it is uncertain in strength, it has been proposed, however, to substitute for it a composition of simple syrup and tincture of opium; but it is not altogether certain if the operation of this is exactly the same; and there is some risk, that from spontaneous decomposition, part of the active matter of the opium may be precipitated. The quantity of syrup prepared from a given weight of the capsules, is considerably larger according to the formula of the Edinburgh Pharmacopœia than those of the others. Whether it is proportionally weaker remains to be ascertained.

SYRUPUS RHAMNI CATHARTICI. Syrup of Buckthorn. Ed.

Take of the Clarified Juice of ripe Buckthorn Berries, two parts; Refined Sugar, one part. Boil, so as to form a syrup.

SYRUPUS RHAMNI. Syrup of Buckthorn. Lond.

Take of the Fresh Juice of Buckthorn Berries, four pints; Ginger Root cut, Pimento Berries bruised, of each half an ounce; Refined Sugar, three pounds and a half. Put aside the juice for three days, that the impurities may subside, and strain. To a pint of the purified juice, add the ginger and pimento; macerate with a gentle heat for four hours, and strain. Boil down the remaining quantity to a pint and a half, then add the sugar, as ordered for preparing syrup.

The juice of the buckthorn is best preserved by being made into a syrup, and it is under this form that it has been used as a cathartic, the dose to an adult being an ounce, or an ounce and a half. Its operation, however, is unpleasant, and the preparation has nothing to recommend it. In the composition of the London Pharmacopœia, the ginger and Jamaica pepper communicate a pleasant flavour, and may obviate the griping it is liable to produce.

SYRUPUS ROSÆ CENTIFOLIÆ. Syrup of Damask or Pale Rose. Ed.

Take of the Fresh Petals of the Damask Rose, one pound; Boiling Water, four pounds; Refined Sugar, three pounds. Macerate the petals in water for twelve hours; then to the strained liquor add the sugar, and boil, so as to form a syrup.

SYRUPUS ROSÆ. Syrup of Rose. Lond.

Take of the Dried Petals of the Damask Rose, seven ounces; Refined Sugar, six pounds; Boiling Water, four pints. Macerate the petals of the rose in water for twelve hours, and strain. Evaporate the strained liquor by a water bath, to two pints and a half; then add the sugar as ordered for the preparation of syrup.

The agreeable flavour of the rose is lost in this syrup; but it has a very weak purgative power, and is sometimes from this quality given to infants in a dose of two or three tea-spoonfuls.

SYRUPUS ROSÆ GALLICÆ. Syrup of Red Rose. Ed.

Take of the Dried Petals of the Red Rose, seven ounces; Boiling Water, five pounds; Refined Sugar, six pounds. Macerate the petals in water for twelve hours; then boil them a little, and strain; to the strained liquor add the sugar, and again boil, so as to form a syrup.

Water, by infusion, extracts the slight astringency and the colour of the red rose; the astringency has been supposed to be such as to counteract the laxative quality of the sugar, and hence it is usually this syrup that enters into the composition of astringent mixtures.

SYRUPUS SCILLÆ MARITIMÆ. Syrup of Squill. Ed.

Take of the Vinegar of Squill, two pounds; Refined Sugar, three pounds and a half. Dissolve the sugar with a gentle heat, so as to form a syrup.

This is a syrup of considerable power, the active matter of squill being dissolved by vinegar without much change, and being little injured in forming it into a syrup. It is the form under which squill is usually prescribed as an expectorant; it is given in a dose of one or two drachms, and it is often added to combinations of expectorant remedies. It is also given to children as an emetic, especially in pertussis, the operation of it being sometimes promoted by the addition of a little ipecacuan or antimonial wine.

SYRUPUS TOLUIFERÆ BALSAMI, *vulgo Syrupus Balsamicus.* Syrup of Tolu Balsam. Ed.

Take of Common Syrup, two pounds; Tincture of Tolu Balsam, one ounce. With the syrup newly prepared, and removed from the fire, when it has nearly cooled, mix the tincture gradually with agitation.

SYRUPUS TOLUTANUS. Tolu Syrup. Lond.

Take of Balsam of Tolu, one ounce; Boiling Water, a pint; Refined Sugar, two pounds. Boil the balsam in the water for half an hour in a close vessel, stirring frequently, and strain the liquor when cold, then add the sugar, as directed for preparing syrup.

The formula of the Edinburgh Pharmacopœia gives an economical mode of preparing this syrup; but the old method, still retained in the London Pharmacopœia, affords a more grateful composition, the syrup being impregnated with the odour of the balsam, without its resinous matter being diffused through it, which, as prepared by the other mode, renders it white and turbid. The syrup is used merely on account of its flavour, and to many this is rather disagreeable. On the supposition of tolu balsam being an expectorant, it sometimes enters into the composition of mixtures used in catarrh.

SYRUPUS VIOLÆ ODORATÆ. Syrup of Violet. Ed.

Take of the fresh flowers of the Sweet-scented Violet, one pound; Boiling Water, four pounds; Refined Sugar, seven pounds and a half. Macerate the flowers in water for twenty-four hours in a covered glass or earthen vessel. Then strain, without expression, and to the strained liquor add the beat sugar, so as to form a syrup.

SYRUPUS VIOLÆ. Syrup of Violet. Dub.

Take of the fresh petals of the Violet, two pounds; Boiling Water, five pints. Macerate for twenty-four hours, then strain the liquor through fine linen without expression, add lastly sugar so as to form a syrup.

This syrup has a fine blue colour, which is, however, lost on keeping. It is a very gentle laxative, and as such is given to infants in a dose of one or two tea-spoonfuls.

IT remains to notice those few syrups which have exclusively a place in the London or Dublin Pharmacopœia.

SYRUPUS CROCI. Syrup of Saffron. Lond.

Take of Saffron, an ounce; Boiling Water, a pint; Refined Sugar, two pounds and a half. Macerate the saffron in the water for twelve hours, in a vessel lightly closed; then strain the liquor, and add the sugar to it.

This syrup is employed in mixtures merely on account of its colour.

SYRUPUS MORI. Syrup of Mulberry. Lond.

Take of Mulberry Juice strained, a pint; Refined Sugar, two pounds. Dissolve the sugar in the juice in the manner directed with regard to syrup.

The syrups of several acidulous fruits had formerly a place in the London Pharmacopœia. This is retained as one of the most grateful.

SYRUPUS RHOEADOS. Syrup of Red Poppy. Lond.

Take of the Recent Petals of the Red Poppy, one pound; Boiling Water, a pint and two fluidounces; Refined Sugar, two pounds and a half. To the water heated by a water-bath, add the petals of the red poppy gradually, stirring them occasionally; then having removed the vessel, macerate for twelve hours; press out the liquor, and put it aside, that the impurities may subside; lastly, add the sugar in the manner directed with regard to common syrup.

SYRUPUS PAPAVERIS ERRATICI. Syrup of Wild Poppy. Dub.

Take of the fresh petals of the Wild Poppy, a pound; Boiling Water, twenty ounces. Add the flowers gradually to the boiling water; then removing the vessel from the fire, macerate with a lower heat for twelve hours; express the liquor, and put it aside that the impurities may subside; lastly add sugar and form a syrup.

This syrup is valued only on account of the fine red colour which it receives from the petals of the flower.

SYRUPUS SENNÆ. Syrup of Senna. Lond.

Take of Senna Leaves, one ounce; Bruised Fennel Seeds, one drachm; Manna, Refined Sugar, of each one pound; Boiling Water, one pint. Macerate the senna leaves and the fennel seeds in water for twelve hours. Strain the liquor, and mix with this the manna and sugar.

SYRUPUS SENNÆ. Syrup of Senna. Dub.

Take of Manna, Refined Sugar, of each a pound; Senna Leaves, half an ounce; Boiling Water, a pint. Macerate the senna in the water in a close vessel for twelve hours; then mix with the strained liquor the manna and sugar so that they may dissolve.

This is designed as a purgative syrup for children. The proportion of saccharine matter in both is too large, and renders the syrup as thick as honey. The infusion of senna, sweetened with sugar, which is in common use, being of extemporaneous preparation, is perhaps preferable.

SYRUPUS ALLII. Syrup of Garlic. Dub.

Take of Garlic Root cut, one pound; of Boiling Water, two pints. Macerate the garlic in the water for twelve hours in a covered vessel, and then add sugar to the strained liquor, so as to form a syrup.

Garlic has been employed as an expectorant in some forms of catarrh and dyspnœa, under the form of syrup. It has perhaps, however, no such power as to entitle it to a place as an officinal preparation.

SYRUPUS OPII. Syrup of Opium. Dub.

Take of the Watery Extract of Opium, eighteen grains; Boiling Water, eight ounces. Macerate them together until the opium be dissolved; then add sugar, so as to form a syrup.

This is designed as a substitute for the syrup of poppy. Tincture of opium, added to simple syrup, has sometimes been used for this purpose; but on keeping, part of the active resinous matter of the opium is liable to separate and subside, and from being diffused in the small portion of syrup at the bottom of the bottle in which it is kept, may be productive of dangerous consequences. The watery extract of opium, not the opium in substance, being dissolved in this syrup, it may not be liable to this objection. It is not altogether certain, however, whether, in the preparation of the watery extract, (to be afterwards noticed), the narcotic power of the opium is not impaired, and, therefore, whether this preparation from it will be always of uniform strength. An ounce of the syrup contains about one grain of the watery extract; its strength, therefore, will be similar to the medium strength of the syrup of poppy.

## MELLITA.—MEDICATED HONEYS.

Honey has been employed instead of saccharine matter in some pharmaceutical preparations. Combined with vinegar, either alone or with the impregnation of the active matter of vegetables, the kind of composition named Oxymel is formed. Combined merely with infusions of vegetable substances, it forms what are more exclusively named Medicated Honeys. As these preparations have no particular advantage over syrups, and as honey, from idiosyncrasy, produces unpleasant effects on some individuals, they have been rejected by the Edinburgh College. A few, however, retain a place in the London and Dublin Pharmacopœias.

MEL DESPUMATUM. Clarified Honey. Lond.

Liquefy honey in a water-bath, then remove the scum.

MEL DESPUMATUM. Clarified Honey. Dub.

Liquefy honey in a water-bath, and remove the scum as it rises.

Honey, as it is expressed from the comb, is liable to contain wax and other impurities. When the honey is liquefied, these in a great measure separate and rise to the surface, so as to be easily removed. The honey thus purified is ordered in the other preparations into which it enters.

MEL BORACIS. Honey of Borax. Lond.

Take of Borax in powder, a drachm; Clarified Honey, an ounce. Mix them.

In this composition, honey is useful, as giving the proper consistence. It is designed as an application in aphthous affections of the tongue and fauces, the borax giving a sense of coolness, and removing the foul crust.

MEL ROSÆ. Honey of Rose. Lond.

Take of the dried Petals of the Red Rose, four ounces; Boiling Water, three pints; Clarified Honey, five pints. Macerate the petals in the water for six hours, then to the strained liquor add the honey, and boil it down in a water-bath to the proper consistence.

MEL ROSÆ. Honey of Rose. Dub.

Take of the Petals of the Red Rose not fully blown, freed from the heels and dried, four ounces; Boiling Water, three pints; Honey, five pounds. Macerate the petals in the water for six hours, mix the honey with the strained liquor, and boil down until it attain the consistence of syrup, removing the scum.

This preparation is similar to the syrup of the red rose, and may be applied to the same purposes.

OXYMEL. Oxymel. Lond.

Take of Purified Honey, two pounds; Acetic Acid (Distilled Vinegar) one pound. Boil them in a glass vessel, on a slow fire, to the proper consistence.

OXYMEL. Oxymel. Dub.

Take of Honey, two pounds; Distilled Vinegar, a pint. Boil in a glass vessel with a gentle heat to the thickness of syrup, removing the scum.

This has long been in use as a remedy in catarrhal affections, and is also the basis of a cooling detergent gargle.

OXYMEL SCILLÆ. Oxymel of Squill. Lond.

Take of Clarified Honey, three pounds; Vinegar of Squill, two pounds. Boil in a glass vessel, over a slow fire, to a proper consistence.

OXYMEL SCILLÆ. Oxymel of Squill. Dub.

Take of Clarified Honey, three pounds; Vinegar of squill, two pints. Boil down in a glass vessel, on a gentle fire, to the thickness of syrup.

Under this form squill has been employed, principally as an expectorant. Its dose is one or two drachms.

OXYMEL COLCHICI. Oxymel of Colchicum. Dub.

Take of the fresh Root of Colchicum cut into thin slices, one ounce; Distilled Vinegar, one pint; Clarified Honey, two pounds. Macerate the colchicum with the vinegar for two days, in a glass vessel; then strain the liquor pressed out strongly from the root, and add the honey. Lastly, boil the mixture, stirring it frequently with a wooden spoon, to the consistence of a syrup.

This is essentially the same with the syrup of colchicum already noticed; nor can it derive any advantage from honey being used in its preparation.

Oxymel æruginis. Oxymel of Verdigrease. Dub.

Take of Prepared Verdigrease, one ounce; Vinegar, seven ounces; Clarified Honey, fourteen ounces. Dissolve the verdigrease in the vinegar, and strain through linen, then add the honey, and boil down to a proper thickness.

Linimentum æruginis. Liniment of Verdigrease. Lond.

Take of Verdigrease in powder, an ounce; Vinegar, seven fluidounces; Clarified Honey, fourteen ounces. Dissolve the verdigrease in the vinegar, and strain through linen, then having added the honey, boil to a proper thickness.

Under this form, verdigrease has been applied as a stimulant and escharotic to foul ulcers.

## CHAP. XI.

### VINA.—WINES.

Wine is capable, by infusion, of extracting several of the proximate principles of vegetable substances. From the alkohol it contains, it dissolves a certain portion of their resin, extract and essential oil; its watery part dissolves their gum or mucilage; and being milder and more pleasant to the taste than diluted alkohol, it is sometimes preferred to it as a solvent; hence Medicated Wines have long been in use, and some of them are retained in the Pharmacopœias.

It cannot be said, however, to be well adapted to this use. Wine itself, when not carefully excluded from the air, is apt to become acescent; and, when it holds vegetable matter in solution, it appears to be still more liable to suffer this change. This has been established by the researches of Parmentier; and he has shewn that the greater number of medicated wines, if kept for any length of time, become medicated vinegars. This change may modify the powers of the dissolved matter; and in some cases, where the wine is taken in a considerable dose, must prove hurtful to the stomach, especially in dyspeptic affections. Accordingly, few of the medicated wines are now employed. The spontaneous decomposition to which these wines are liable, is sometimes attempted to be obviated by the addition of a portion of alkohol, but this is attended only with imperfect success.

From the tartaric acid which wines contain, they are capable of acting chemically on some of the metals, and are better solvents of some metallic preparations than water or alkohol.

VINUM ALOES SOCOTORINÆ, *vulgo Tinctura Sacra.* Wine of Socotorine Aloes. *Sacred Tincture.* Ed.

Take of Socotorine Aloes, reduced to powder, one ounce; Lesser Cardamom Seeds, Ginger Root, of each, bruised, one drachm; Spanish White-wine, two pounds. Digest for seven days, shaking frequently, and strain.

VINUM ALOES. Wine of Aloes. Lond.

Take of Aloes, eight ounces; Canella Bark, two ounces; Wine, six pints; Proof-spirit, two pints. Triturate the aloes with white sand freed from impurities, into powder; rub the canella bark to powder, and upon these mixed pour the wine and spirit. Macerate for fourteen days, shaking occasionally, and strain.

VINUM ALOES. Wine of Aloes. Dub.

Take of Socotorine Aloes, four ounces; Canella, an ounce: Spanish White-wine, three pints; Proof-spirit, one pint. Mix the aloes and canella separately reduced to powder, and pour on the wine mixed with the spirit. Digest for fourteen days, shaking the vessel frequently; lastly, strain the liquor.

The trituration with sand directed by the London college is designed to facilitate the solution of the aloes, and is not very necessary. Aloes being soluble in wine, even without the aid of proof-spirit, all its virtues are obtained in this solution, and from the presence of the resinous matter of the aloes it is not liable to decomposition. It is a stimulating purgative, which has long been in use under the name of Sacred Tincture. It produces its full effect in the dose of one ounce. In a dose of one or two drachms, it is given to excite the action of the intestines and neighbouring organs, in dyspepsia, amenorrhœa and similar affections.

VINUM GENTIANÆ COMPOSITUM, *vulgo Vinum Amarum.* Compound Gentian Wine. Ed.

Take of Gentian Root, half an ounce; Peruvian Bark, one ounce; Orange-Peel dried, two drachms; Canella Bark, one drachm; Diluted Alcohol, four ounces; Spanish White-wine, two pounds and a half. On the root and barks cut and bruised, pour first the diluted alkohol; and after twenty-four hours, add the wine. Then macerate for seven days, and strain.

This wine is designed as a stomachic; and has been regarded as preferable to the tincture of similar composition, as being more mild and grateful, and therefore better for continued use; but from its tendency to become acescent, it is not well adapted to administration in dyspepsia. Its dose is six drachms.

VINUM IPECACUANHÆ. Ipecacuan Wine. Ed.

Take of Ipecacuan Root bruised, one ounce; Spanish White-wine, fifteen ounces. Macerate for seven days, and strain through paper.

VINUM IPECACUANHÆ. Wine of Ipecacuan. Lond.

Take of Root of Ipecacuan bruised, two ounces; Wine, two pints. Macerate for fourteen days, and strain.

VINUM IPECACUANHÆ. Wine of Ipecacuan. Dub.

Take of Root of Ipecacuan bruised, two ounces; Spanish White-wine, two pints. Digest for seven days, then strain.

Wine extracts sufficiently the active matter of ipecacuan, and covers its taste and flavour, while it has the advantage of being less pungent than diluted alkohol. This wine is often used as an emetic, especially to children, to whom, from being not ungrateful, it can be given without difficulty. Its dose is one ounce to an adult, one drachm to a child a year old. The former quantity is supposed to be equal to 15 grains of the root.

VINUM NICOTIANÆ TABACI. Tobacco Wine.

Take of the Leaves of Tobacco, one ounce; Spanish White-wine, one pound. Macerate for seven days, and strain through paper.

Under this form, Tobacco has been used as a diuretic in dropsy. The dose is thirty drops, gradually increased to sixty or eighty twice a-day. It is liable, however, to excite sickness in this large dose, and in a smaller dose often fails in its diuretic effect.

VINUM RHEI PALMATI. Rhubarb Wine.

Take of the Root of Rhubarb cut, two ounces; Canella Bark bruised, one drachm; Diluted Alkohol, two ounces; Spanish White-wine, fifteen ounces. Macerate for seven days, and strain through paper.

Wine extracts the active matter of rhubarb, and this medicated wine operates as a purgative, in a dose from half an ounce to an ounce. The tincture is in general to be preferred to it, as more uniform, and not liable to decomposition.

VINUM OPII. Wine of Opium. Lond.

Take of Extract of Opium, an ounce; Cinnamon Bark bruised, Cloves bruised, each, one drachm; Wine, a pint. Macerate for eight days, and strain.

Wine appears to dissolve sufficiently the active matter of opium, and has often been used as a menstruum. With the addition of aromatics, it formed the liquid laudanum of Sydenham, and was at one time an officinal preparation in the Pharmacopœias, though afterwards excluded, to give place to the simple tincture of opium. It is now restored by the London College, as it had still continued in use, and is supposed to have some advantages over the tincture; and from the addition of the aromatics in particular, to be less liable to occasion nausea. It is nearly of the same strength. Vinegar impairs the narcotic power of opium; hence if this medicated wine were liable to acescency, it might be regarded as an uncertain preparation, but it is possible that the resino-extractive matter of the opium and the aromatics may counteract any spontaneous decomposition. The wine of opium has also been recommended strongly by Mr Ware as the best form under which opium can be used as a local application in chronic ophthalmia, two or three drops of it being introduced under the eyelids.

Vinum ferri. Wine of Iron. Lond.

Take of Filings of Iron, two ounces; Wine, two pints. Mix and put aside for a month, shaking occasionally, then strain through paper.

Vinum ferri. Wine of Iron. Dub.

Take of Iron Wire in small pieces, four ounces; White Rhenish wine, four pints. Sprinkle the pieces of iron with a little of the wine, and expose them to the air, until they are covered with rust; then add the remaining wine: digest for seven days, shaking the vessel occasionally, and lastly strain the wine.

The iron being oxidated by the joint action of the wine and the atmospheric air, a portion of the oxide is dissolved by the tartaric acid of the wine The chalybeate impregnation must, however, be variable, according to the acidity of the wine, and it is therefore perhaps preferable to employ a preparation of more uniform strength.

# CHAP. XII.

## ACETA.—VINEGARS.

VINEGAR is generally capable of dissolving all those proximate principles of vegetables which are soluble in water, and with regard to some substances its acid appears farther to increase its solvent power. But, at the same time, it very often modifies their medicinal qualities, either by the chemical changes it occasions, or more generally, perhaps, by the action it exerts on the stomach. Hence there is only one medicated vinegar of any importance,—the Vinegar of Squill; the active matter of this root being dissolved by it, and suffering apparently no alteration. The activity of colchicum appears to reside in a similar acrid matter, and it also affords a medicated vinegar; of less importance, however, as the colchicum itself is little employed. As a solvent of camphor, the concentrated acetic acid is also used in one preparation.

ACETUM AROMATICUM. Aromatic Vinegar. Ed.

Take of the dried tops of Rosemary; the dried leaves of Sage, of each four ounces; dried Lavender Flowers, two ounces; Cloves, two drachms; distilled Acetous Acid, eight pounds. Macerate for seven days, and strain the expressed liquor through paper.

This is an improved formula for a preparation which has long had a place in the different Pharmacopœias, under the name of Acetum Prophylacticum, having attained celebrity as an antiseptic and preservative against the operation of contagion. From the impregnation of the vinegar with the flavour of the aromatic vegetables, it is a grateful perfume, but it is weak, and its odour is very soon impaired.

ACIDUM ACETOSUM CAMPHORATUM. Camphorated Acetous Acid. Ed.

Take of the stronger Acetous Acid, six ounces; Camphor, half an ounce. Rub the camphor with a little alkohol into powder, which put into the acid, that it may be dissolved.

ACIDUM ACETICUM CAMPHORATUM. Dub.

Take of Acetic Acid, six ounces; Camphor, half an ounce; Rectified Spirit of Wine, as much as may be sufficient. Reduce the camphor to powder by the aid of the spirit, then add the acid and dissolve.

Camphor is soluble in the concentrated acetic acid, and the solution has an odour highly fragrant and pungent. It has been used as a stimulating perfume, more grateful than the common odoriferous essences. It forms what is named Aromatic Spirit of Vinegar. The preparation of the Pharmacopœias, however, especially that of the Edinburgh College, is inferior in pungency, owing to a weaker acetic acid being employed.

ACETUM SCILLÆ MARITIMÆ. Vinegar of Squill. Ed.

Take of Squill Root dried, two ounces; distilled Acetous Acid, two pounds and a half; Alkohol, three ounces. Macerate the squill with the acetous acid for seven days: express the acid; to which add the alkohol; and when the impurities have subsided, pour off the liquor.

ACETUM SCILLÆ. Vinegar of Squill. Lond.

Take of Squill Root recently dried, a pound; Vinegar, six pints; Proof Spirit, half a pint. Macerate the squill root with the vinegar in a close glass vessel with a gentle heat, for twenty-four hours; then express, and put aside, that the impurities may subside; lastly, add the spirit to the pure liquor.

ACETUM SCILLÆ. Vinegar of Squill. Dub.

Take of Squill Root recently dried, half a pound; Wine Vinegar, three pints; Rectified Spirit of Wine, four ounces. Digest the squill root with the vinegar for four days in a glass vessel, agitating frequently; then express the vinegar, to which poured off, after the impurities subside, add the spirit.

Vinegar appears to dissolve completely the active matter of squill, without much impairing its powers: the addition of the alkohol is designed to counteract any spontaneous decomposition to which the vinegar might be liable. Under this form, squill has long been employed as an expectorant: the dose is one drachm; or more usually it is given in the form of syrup, prepared from this medicated vinegar. The proportion of squill ordered by the different Colleges is very various, and if all its active matter is dissolved, must afford preparations of very unequal strength.

ACETUM COLCHICI. Vinegar of Meadow Saffron. Lond.

Take of the fresh Root of Meadow Saffron cut, one ounce; Distilled Vinegar, a pint; Proof-Spirit, a fluidounce. Macerate the root with the vinegar, in a close glass vessel, for twenty-four hours; then press it out, and put it aside, that the impurities may subside; lastly, add the spirit to the clear liquor.

Colchicum bears a considerable resemblance to squill, and its active matter is so far similar, that it appears to be dissolved by vinegar, without its powers being altered. It has been given as a diuretic in dropsy, either under this form, or made into an oxymel, by the addition of honey; but in modern practice it is little employed.

## CHAP. XIII.

### TINCTURÆ.—TINCTURES.

Tinctures are solutions usually of vegetable, sometimes, however, of animal, and even of mineral substances in spiritous liquors. The solvent may be alkohol either pure, diluted with water, or impregnated with ammonia or ether. Alkohol dissolves the resin, camphor, extract, and essential oil of plants: it is more particularly employed as the menstruum for substances purely resinous, or the powers of which reside in a resin. Where a portion of gum is mingled with the resin, or where tannin or extractive matter is the active principle, diluted alkohol is the proper solvent: it in general dissolves the active matter of all entire vegetable substances, as the bark, leaves, flowers; and wherever it can be properly applied, it is preferable to pure alkohol, both as more economical and as less pungent. Alkohol, impregnated with ammonia, is employed only in forming tinctures of a few substances, with the medicinal operation of which, ammonia is supposed to coincide.

Tinctures usually contain the active matter of the substances from which they are prepared, in a more concentrated state than infusions or decoctions, the power of the solvent being greater; hence they require to be given only in a small dose; and the power of the solvent, which is otherwise considerable, may in general be neglected. They have the still more important advantage of not being liable to spontaneous decomposition; the affinities of the elements of vegetable matter, whence new combinations are established, which are favoured by water, being counteracted by alkohol; and hence a tincture, if kept secluded from the air, so as to prevent the loss of the alkohol by evaporation, can be preserved any length of time without decomposition.

Tinctures are prepared by infusing the materials reduced to a coarse powder in the spirit, with frequent agitation, but without the application of heat. By applying heat, the solvent power is so far promoted, that the impregnation is effected in a shorter time; but the inactive and grosser matter, it has been supposed, is frequently liable to be extracted, and the high temperature is farther unnecessary as, by allowing the solvent to remain a sufficient time (fourteen days usually) on the ingredients, it is fully saturated. Alkaline salts were at one time supposed to increase the solvent power, both of alkohol and diluted alkohol, the tincture being of a much deeper colour when a small portion had been added. But this arises, in part at least, from the action of the alkali on the colouring matter, as the same effect is obtained when they are added to a tincture already prepared; and even where they increase the solubility of some principles, as of resinous matter, they do not always coincide in medicinal operation with the substance operated on, while they render the tincture much more nauseous.

Some tinctures are liable to decomposition on diluting them with water, those especially prepared with pure alkohol, in which resinous matter chiefly is dissolved, the resin being precipitated. Even some tinctures prepared with diluted alkohol hold dissolved so much resin that they are rendered turbid by dilution with water; others, which contain extractive matter chiefly, or tannin, remain transparent. It sometimes happens even that a decomposition ensues on mixing a tincture prepared with alkohol with another prepared with diluted alkohol. Such decompositions require to be attended to in their administration, and to be so far obviated, at least when the precipitation is copious, as that by trituration with mucilage the resinous matter shall be diffused.

TINCTURA ALOES SOCOTORINÆ. Tincture of Aloes. Ed.

Take of Socotorine Aloes in powder, half an ounce; Extract of Liquorice, one ounce and a half; Alkohol, four ounces; Water, one pound. Digest for seven days with a gentle heat in a close vessel, shaking the vessel frequently, and pour off the tincture when clear.

TINCTURA ALOES. Tincture of Aloes. Lond.

Take of Aloes bruised, half an ounce; Extract of Liquorice, an ounce and a half; Water, a pint; Rectified Spirit, four fluid-ounces. Macerate in a sand-bath until they are dissolved; then strain.

TINCTURA ALOES. Tincture of Aloes. Dub.

Take of Socotorine Aloes in powder, half an ounce; Extract of Liquorice, an ounce and a half, dissolved in eight ounces of Boiling Water; Proof Spirit, eight ounces. Digest for seven days; then strain.

This tincture is the only one in which the solvent has a larger proportion of water than the diluted alkohol of the usual strength, the aloes being sufficiently dissolved even by this weak spirit. The liquorice is designed to cover the taste, which it does very imperfectly. The tincture may be employed as a cathartic in the dose of an ounce, but is seldom used; aloes, from its intense bitterness, being better prescribed under the form of pill.

TINCTURA ALOES ÆTHEREA. Ethereal Tincture of Aloes. Ed.

Take of Socotorine Aloes, Myrrh, of each in powder, one ounce and a half; English Saffron, one ounce; Spirit of Sulphuric Ether, one pound. Digest the myrrh with the spirit for four days in a closed phial; then add the saffron and aloes. Digest again for four days; and when the impurities have subsided, pour off the tincture.

If the ingredients of this tincture were digested together, the spirit would be so much saturated with the aloes, as to take up little of the myrrh; but by digesting it first on the myrrh, it dissolves a larger quantity of it, and is capable of dissolving afterwards a sufficient proportion of the aloes and saffron. The spirit of sulphuric ether affords a more grateful tincture than alkohol, but it is difficult to preserve the tincture long without the escape of the ether from its volatility. A similar preparation has long had a place in the Pharmacopœias, under the name of Elixir Proprietatis, and has been much used as a stimulant aperient in dyspeptic affections, jaundice and amenorrhœa, given in a dose of one or two drachms. In the dose of six drachms it acts as a cathartic.

TINCTURA ALOES CUM MYRRHA. Tincture of Aloes and Myrrh. Ed.

Take of Myrrh in powder, two ounces; Alkohol, one pound and a half; Water, half a pound. Mix the alkohol with the water; then add the myrrh; digest for four days; and lastly, add, of Socotorine Aloes, one ounce and a half; English Saffron, one ounce. Digest again for three days, and pour off the pure tincture.

TINCTURA ALOES COMPOSITA. Compound Tincture of Aloes. Lond.

Take of Aloes in powder, Saffron, of each three ounces; Tincture of Myrrh, two pints. Macerate fourteen days, and strain.

TINCTURA ALOES COMPOSITA. Compound Tincture of Aloes. Dub.

Take of Tincture of Myrrh, two pints; Socotorine Aloes in powder, Saffron, of each three ounces. Digest for seven days, then strain.

This tincture differs in little from the former but in the menstruum. Being less grateful, it is seldom administered internally, but is used as an application to bleeding wounds, and a stimulant to foul ulcers.

TINCTURA AMOMI REPENTIS. Tincture of Cardamom. Ed.

Take of Cardamom Seeds, four ounces; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA CARDAMOMI. Tincture of Cardamom. Lond.

Take of Cardamom Seeds bruised, three ounces; Proof Spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA CARDAMOMI. Tincture of Cardamom. Dub.

Take of Cardamom Seeds freed from the capsules and bruised, three ounces; Proof Spirit, two pints. Digest for seven days, and strain.

This tincture is used for its aromatic flavour and pungency; and as these are not considerable, it is but little employed.

TINCTURA ARISTOLOCHIÆ SERPENTARIÆ. Tincture of Snake-Root. Ed.

Take of Virginian Snake-Root bruised, two ounces; Cochineal in powder, one drachm; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA SERPENTARIÆ. Tincture of Snake-Root. Lond.

Take of Snake-Root, three ounces; Proof Spirit, two pints. Macerate fourteen days, and strain.

TINCTURA SERPENTARIÆ. Tincture of Snake-Root. Dub.

Take of Virginian Snake-Root cut and bruised, three ounces; Proof Spirit, two pints. Digest for seven days: then strain.

Serpentaria is seldom exhibited under the form of tincture, and it would require indeed to be given in such a dose, that the power of the menstruum would be predominant. As a grateful bitter, it may be given occasionally in dyspepsia in a dose of two drachms.

TINCTURA BENZOINI COMPOSITA, *vulgo Balsamum Traumaticum.* Compound Tincture of Benzoin. Ed.

Take of Benzoin in powder, three ounces; Balsam of Peru, two ounces; Hepatic Aloes, half an ounce; Alcohol, two pounds. Digest for seven days, and strain through paper.

TINCTURA BENZOINI COMPOSITA. Compound Tincture of Benzoin. Lond.

Take of Benzoin, three ounces; Storax, strained, two ounces; Balsam of Tolu, an ounce; Aloes, half an ounce; Rectified Spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA BENZOES COMPOSITA. Compound Tincture of Benzoin. Dub.

Take of Benzoin, three ounces; Purified Storax, two ounces; Balsam of Tolu, an ounce; Socotorine Aloes, half an ounce; Rectified Spirit of Wine, two pints. Digest for seven days; then strain.

This is used externally as a styptic, to recent superficial wounds, and forms a useful corrugating and agglutinating application. It has long been in use under the name of Wade's Balsam and Friar's Balsam. A piece of linen moistened with it stops the hæmorrhage from a slight wound, and allows it to heal by the first intention. It is also sometimes applied as a stimulant to foul ulcers.

TINCTURA CAMPHORÆ, *vulgo Spiritus Vinosus Camphoratus.* Tincture of Camphor. Ed.

Take of Camphor, one ounce; Alkohol, one pound. Mix, so as to dissolve the camphor. It may be also made with a double or triple proportion of camphor.

SPIRITUS CAMPHORÆ. Spirit of Camphor. Lond.

Take of Camphor, four ounces; Rectified Spirit, two pints. Mix, so as to dissolve the camphor.

SPIRITUS CAMPHORATUS. Camphorated Spirit. Dub.

Take of Camphor, an ounce; Rectified Spirit of Wine, eight ounces by measure. Mix, so as to dissolve the camphor.

This solution is used externally as a stimulating and anodyne application in chronic rheumatism and spasmodic pains, being rubbed on the part. It is applied in a similar manner to bruises and strains, to remove the swelling and relieve the pain which attends them. Linen moistened with it is used as an application to chilblains; and it is sometimes added in small quantity to collyria employed in ophthalmia.

LINIMENTUM CAMPHORÆ COMPOSITUM. Compound Camphor Liniment. Lond.

Take of Camphor, two ounces; Water of Ammonia, six ounces; Spirit of Lavender, a pint. Mix the water of ammonia with the spirit, and distil a pint from a glass retort with a gentle heat. Dissolve the camphor in the distilled liquor.

This liniment is applied to the same uses as the preceding, but the addition of the ammonia renders it more powerful as a stimulant and rubefacient.

TINCTURA CASTOREI. Tincture of Castor. Ed.

Take of Russian Castor, one ounce and a half; Alkohol, one pound. Digest for seven days, and strain through paper,

TINCTURA CASTOREI. Tincture of Castor. Lond.

Take of Castor in powder, two ounces; Rectified Spirit, two pints. Macerate for seven days, and strain.

TINCTURA CASTOREI ROSSICI. Tincture of Russian Castor. Dub.

Take of Russian Castor in powder, two ounces; Proof Spirit, two pints. Digest for seven days, and strain. (A tincture is ordered to be prepared in the same manner from Canadian Castor).

Castor is a substance nearly inert; and this tincture, in which a small quantity of it only is dissolved, can scarcely be supposed to have any medicinal efficacy. It is given sometimes as an antispasmodic in hysteria, in a dose of from half a drachm to a drachm. It is more grateful when prepared with alkohol than when prepared with proof spirit.

TINCTURA CASTOREI COMPOSITA. Compound Tincture of Castor. Ed.

Take of Russian Castor, one ounce; Assafœtida, half an ounce; Ammoniated Alkohol, one pound. Digest for seven days, and strain through paper.

This tincture is rather more active than the former, from the addition of the assafœtida and the ammonia. It is given in hysteria in the dose of a drachm.

TINCTURA CINCHONÆ OFFICINALIS. Tincture of Peruvian Bark. Ed.

Take of Peruvian Bark in powder, four ounces; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA CINCHONÆ. Tincture of Cinchona. Lond.

Take of Peruvian Bark in powder, seven ounces; Proof Spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA CINCHONÆ. Tincture of Cinchona. Dub.

Take of Cinchona Bark in coarse powder, four ounces; Proof Spirit, two pints.

The proportion of Bark in the formula of the London College to that of Spirit, is nearly double that in the others, whether with the effect of rendering the tincture much stronger may be considered as doubtful. The active matter of bark is extracted by diluted alkohol, but so sparingly, that it may be doubted whether in the tincture the powers of the menstruum are not greater than those of the bark. It cannot therefore be employed where large quantities of cinchona are required. It is used only as a bitter in dyspepsia, occasionally, in a dose of two drachms, and for this purpose the compound tincture of bark, to be afterwards noticed, is preferable; though both are liable to the objection common to all these bitter tinctures, that of accustoming the stomach to the stimulus of ardent spirit, and leading to the habit of dram-drinking.

TINCTURA CINNAMOMI COMPOSITA, *olim Tinctura Aromatica.* Compound Tincture of Cinnamon, formerly Aromatic Tincture. Ed.

Take of Cinnamon Bark bruised, Cardamom Seeds bruised, each one ounce; Long Pepper in powder, two drachms; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain.

TINCTURA CINNAMOMI COMPOSITA. Compound Tincture of Cinnamon. Lond.

Take of Cinnamon Bark bruised, six drachms; Cardamom Seeds bruised, three drachms; Long Pepper in powder, Ginger Root cut, of each two drachms; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA CINNAMOMI COMPOSITA. Compound Tincture of Cinnamon. Dub.

Take of Cinnamon Bark, bruised, six drachms; Cardamom Seeds freed from the capsules, three drachms; Long Pepper, Ginger, of each in powder, two drachms; Proof-spirit, two pints. Digest for seven days, and strain.

This is a grateful aromatic tincture, seldom used by itself, but frequently added to other tinctures, or to mixtures, to communicate flavour and pungency. It is thus often used in combination with bitters and astringents.

TINCTURA COLOMBÆ. Tincture of Colombo. Ed.

Take of the Root of Colombo in powder, two ounces; diluted Alkohol, two pounds. Digest for seven days, and strain through paper.

TINCTURA CALOMBÆ. Tincture of Colombo. Lond.

Take of Colombo Root cut, two ounces and a half; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA COLOMBO. Tincture of Colombo. Dub.

Take of Colombo Root in powder, two ounces; Proof-spirit, two pints. Digest for seven days, then strain.

Colombo does not appear to yield its active matter very readily either to watery or spirituous menstrua; at least this tincture is not strong, and cannot be employed for any of the more important purposes for which this root is prescribed. It is therefore used merely as a bitter tincture in dyspepsia, in a dose of three or four drachms.

TINCTURA CONVOLVULI JALAPÆ. Tincture of Jalap. Ed.

Take of the Roop of Jalap in powder, three ounces; Diluted Alkohol, fifteen ounces. Digest for seven days, and strain through paper.

TINCTURA JALAPÆ. Tincture of Jalap. Lond.

Take of Jalap Root in powder, eight ounces. Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA JALAPÆ. Tincture of Jalap. Dub.

Take of Jalap Root reduced to coarse powder, five ounces; Proof-spirit, two pints. Digest for seven days, then strain.

The activity of jalap resides in a resinous matter, which in this tincture is extracted along with a portion of mucilage. It may be given as a cathartic, in a dose of four or six drachms. Jalap, however, is usually given in substance, and scarcely ever under this form.

TINCTURA CROCI. Tincture of Saffron. Ed.

Take of English Saffron, one ounce; Diluted Alkohol, fifteen ounces. Digest for seven days, and strain through paper.

TINCTURA CROCI. Tincture of Saffron. Dub.

Take of Saffron, an ounce; Proof-spirit, a pint. Digest for seven days; then strain.

This tincture is to be valued only for its colour.

TINCTURA DIGITALIS PURPUREÆ. Tincture of Foxglove. Ed.

Take of the dried Leaves of Foxglove, one ounce; Diluted Alkohol, eight ounces. Digest for seven days, and strain through paper.

TINCTURA DIGITALIS. Tincture of Foxglove. Lond.

Take of the dried Leaves of Foxglove, four ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA DIGITALIS. Tincture of Foxglove. Dub.

Take of the Leaves of Foxglove (rejecting those of a large size) dried and reduced to coarse powder, two ounces; Proof-spirit, one pint. Digest for seven days; then strain.

The active matter of foxglove appears to be completely extracted by diluted alkohol. The tincture is not, however, so much used to obtain the operation of the plant as a diuretic, but rather as a narcotic; and it is with this latter view that it has been introduced as the form under which foxglove is prescribed in hæmoptysis and phthisis: it has also the important advantages, that it can be kept without the powers of the digitalis being impaired, and that its dose is easily regulated. The usual dose is ten drops, which, according to the general rules observed in the administration of digitalis, is to be continued until its effects are obtained.

TINCTURA FERULÆ ASSAFOETIDÆ. Tincture of Assafœtida. Ed.

Take of Assafœtida, four ounces; Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA ASSAFŒTIDÆ. Tincture of Assafœtida. Lond.

Take of Assafœtida, four ounces; Rectified Spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA ASSAFŒTIDÆ. Tincture of Assafœtida. Dub.

Take of Assafœtida, four ounces; Rectified Spirit, two pints; Water, half a pint. To the assafœtida rubbed with the water, add the spirit. Digest for seven days, then strain.

Alkohol is used as the solvent in this tincture, as it is more grateful than when made with proof-spirit. As a remedy in tympanitis and hysteria, it is sometimes given in a dose of one drachm; but in any quantity in which it can be given, so that the operation of the solvent shall not be predominant, its effects must be extremely trivial. It is decomposed on mixing it with water, and forms a white turbid liquor.

TINCTURA GENTIANÆ COMPOSITA, *vulgo Elixir Stomachicum.* Compound Tincture of Gentian. Ed.

Take of Gentian Root, two ounces; dried Orange-Peel, one ounce; Canella Bark, half an ounce; Cochineal, half a drachm; Diluted Alcohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA GENTIANÆ COMPOSITA. Compound Tincture of Gentian. Lond.

Take of Gentian Root cut, two ounces; Orange-Peel dried, an ounce; Cardamom Seeds bruised, half an ounce; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA GENTIANÆ COMPOSITA. Compound Tincture of Gentian. Dub.

Take of Gentian Root cut and bruised, two ounces; dried Orange-Peel, an ounce; Cardamom Seeds, freed from the capsules, half an ounce; Proof-spirit, two pints. Digest for seven days, then strain.

In this tincture, the bitterness of the gentian is extracted, and it is rendered more grateful by the aromatic quality of the orange-peel and canella. It is used as a stomachic in a dose of two or three drachms, in cases where the stomach is disordered from any occasional cause. In more permanent forms of dyspepsia, it cannot be employed with equal advantage, and the continued use of tinctures of this kind ought always to be avoided, as being liable to the pernicious consequence of accustoming the stomach to the stimulus of ardent spirit.

TINCTURA GUAJACI. Tincture of Guaiac. Ed.

Take of the Resin of Guaiac, one pound; Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA GUAJACI. Tincture of Guaiac. Lond.

Take of the Gum-Resin of Guaiac rubbed to powder, half a pound; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA GUAJACI. Tincture of Guaiac. Dub.

Take of Guaiac, four ounces; Rectified Spirit, two pints. Digest for seven days, and strain.

This tincture may be given in a dose of two or three drachms, and has sometimes been employed as a form of giving guaiac in rheumatism and gout; but it is inferior in activity to the one which follows: and it forms a very ungrateful mixture with water, from the copious precipitation of its resinous matter. This is more particularly the case with the tincture prepared according to the formula of the Edinburgh College, in which the proportion of guaiac is unnecessarily large.

TINCTURA GUAJACI AMMONIATA. Ammoniated Tincture of Guaiac. Ed.

Take of the Resin of Guaiac, four ounces; Ammoniated Alkohol, one pound and a half. Digest for seven days, and strain through paper.

TINCTURA GUAJACI AMMONIATA. Ammoniated Tincture of Guaiac. Lond.

Take of the Gum-Resin of Guaiac in powder, four ounces; Compound Spirit of Ammonia, a pint and a half. Macerate for fourteen days, and strain.

TINCTURA GUAJACI AMMONIATA. Ammoniated Tincture of Guaiac. Dub.

Take of Guaiac, four ounces; Spirit of Ammonia, a pint and a half. Digest for seven days, then strain.

As the ammonia coincides with the guaiac as a stimulant and diaphoretic, this affords a preparation of more efficacy than the simple tincture, and it is more frequently employed. It is given in chronic rheumatism, in a dose from one to two drachms.

TINCTURA HELLEBORI NIGRI. Tincture of Black Hellebore. Ed.

Take of Black Hellebore Root bruised, four ounces; Cochineal, half a drachm; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA HELLEBORI NIGRI. Tincture of Black Hellebore. Lond.

Take of Black Hellebore Root cut, four ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA HELLEBORI NIGRI. Tincture of Black Hellebore. Dub.

Take of Black Hellebore Root in coarse powder, four ounces; Cochineal in powder, two scruples; Proof-spirit, two pints. Digest for seven days, then strain.

It was under the form of this tincture that black hellebore was celebrated by Mead as an emmenagogue, in a dose of one drachm. Cullen remarks with regard to it, that he had never found it successful, and it is now scarcely ever used.

TINCTURA HYOSCYAMI NIGRI. Tincture of Black Henbane. Ed.

Take of the dried Leaves of Black Henbane, one ounce; Diluted Alkohol, eight ounces. Digest for seven days, and strain through paper.

TINCTURA HYOSCYAMI. Tincture of Henbane. Lond.

Take of the dried Leaves of Henbane, four ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA HYOSCYAMI. Tincture of Henbane. Dub.

Take of the dried Leaves of Black Henbane in coarse powder, two ounces and a quarter; Proof-spirit, a pint. Digest for seven days, then strain.

Henbane has been introduced in modern practice chiefly as a substitute for opium in particular cases. The inspissated juice being liable to be variable in strength, the tincture has been employed, and has now a place in all the Pharmacopœias, nearly of the same strength. Its dose has been stated at twenty-five drops, but in general not much effect is obtained from it under a dose of half a drachm. A combination of it with tincture of opium proves a more certain anodyne and narcotic than when it is given alone, and is in some measure free from the inconveniences which opium by itself is liable to produce; and, in particular, from the constipating effect of the latter.

TINCTURA KINO. Tincture of Kino. Ed.

Take of Kino, two ounces; Diluted Alkohol, one pound and a half.

TINCTURA KINO. Tincture of Kino. Lond.

Take of Kino in powder, three ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA KINO. Tincture of Kino. Dub.

Take of Kino in powder, three ounces; Proof-spirit, a pint and a half. Digest for seven days, then strain.

Kino consists principally of tannin: it is entirely soluble in diluted alkohol. The dose of this tincture is from half a drachm to a drachm; it is not unfrequently prescribed as an astringent.

TINCTURA LAURI CINNAMOMI. Tincture of Cinnamon.

Take of Cinnamon Bark bruised, three ounces; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA CINNAMOMI. Tincture of Cinnamon. Lond.

Take of Cinnamon Bark bruised, three ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA CINNAMOMI Tincture of Cinnamon. Dub.

Take of Cinnamon Bark, bruised, three ounces; Proof-spirit, two pints. Digest for seven days, then strain.

The diluted alkohol is impregnated with the aromatic flavour of the cinnamon, and it is merely as possessing this flavour and a slight astringency that this tincture is used in mixtures.

TINCTURA MELOES VESICATORII, *vulgo Tinctura Cantharidum.* Tincture of Cantharides. Ed.

Take of Cantharides bruised, one drachm; Diluted Alkohol, one pound. Digest for seven days, and strain through paper.

TINCTURA LYTTÆ. Tincture of Cantharides. Lond.

Take of Cantharides, three drachms; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA CANTHARIDIS. Tincture of Cantharides. Dub.

Take of Cantharides rubbed to powder, two drachms; Cochineal in powder, half a drachm; Proof-spirit, a pint and a half. Digest for seven days, then strain.

Diluted alkohol extracts and holds dissolved the acrid matter of cantharides, and it is under this form that this substance has been generally employed internally, being more manageable in its dose than it is in powder. It has been given as a diuretic in dropsy, and as a remedy in incontinence of urine, gleet, leucorrhœa, and some cutaneous diseases. Its dose is from ten to twenty drops, increased gradually until some sensible operation is produced. Dr C. Smyth has remarked, however, that in ischuria arising from debility of the coats of the bladder, he had found little advantage derived from the tincture, while in substance the cantharides had been successful. The tincture is also employed externally as a rubefacient.

TINCTURA MIMOSÆ CATECHU, *olim Tinctura Japonica.* Tincture of Catechu. Ed.

Take of Catechu, three ounces; Bark of Cinnamon, two ounces; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

TINCTURA CATECHU. Tincture of Catechu. Lond.

Take of Extract of Catechu, three ounces; Cinnamon Bark bruised, two ounces; Proof-spirit, two pints. Maccrate for fourteen days, and strain.

TINCTURA CATECHU. Tincture of Catechu. Dub.

Take of Catechu, three ounces; Cinnamon Bark bruised, two ounces; Proof-spirit, two pints. Digest for seven days, then strain.

Catechu, consisting almost entirely of tannin and extractive matter, is dissolved by diluted alkohol, and in this tincture it is rendered more grateful by the cinnamon. It is given in a dose of one drachm, as an astringent, principally in diarrhœa.

TINCTURA MYRRHÆ. Tincture of Myrrh. Ed.

Take of Myrrh in powder, three ounces; Alkohol, twenty ounces; Water, ten ounces. Digest for ten days, and strain through paper.

TINCTURA MYRRHÆ. Tincture of Myrrh. Lond.

Take of Myrrh bruised, three ounces; Rectified Spirit, twenty-two fluidounces; Water, a pint and a half. Macerate for fourteen days, and strain.

TINCTURA MYRRHÆ. Tincture of Myrrh. Dub.

Take of Myrrh bruised, three ounces; Proof-spirit, a pint and a half; Rectified Spirit, half a pint. Digest for seven days, then strain.

Myrrh being principally resinous, is not entirely soluble in common proof-spirit, and therefore alkohol less diluted is properly ordered for its solution in the Dublin and Edinburgh Pharmacopœias; while the London College have improperly ordered a weaker spirit even than proof, with which a proper solution cannot be obtained. The tincture is used principally as an external stimulant and antiseptic application, more especially in affections of the teeth and gums, either directly applied, or added to detergent gargles.

TINCTURA OPII, *sive Thebaica; vulgo, Laudanum liquidum.* Tincture of Opium. Ed.

Take of Opium, two ounces; Diluted Alkohol, two pounds. Digest for seven days, and strain through paper.

TINCTURA OPII. Tincture of Opium. Lond.

Take of Hard Opium in powder, two ounces and a half; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA OPII, *sive Tinctura Thebaica.* Tincture of Opium. Dub.

Take of Hard Purified Opium in coarse powder, ten drachms; Proof-spirit, a pint. Digest for seven days, then strain.

In this tincture all the active matter of opium is dissolved, the residuum being impurities or insoluble matter, and a given quantity of the tincture having been found to produce the same effects on the system nearly as the quantity of opium, which, by calculation, it contained, ought to do, allowance being made for the undissolved matter. The proportion of opium to each drachm of the tincture is five grains, but by evaporation it is found to yield only three grains and a half; twenty-five drops is supposed to be equal in power to one grain of solid opium, and is the dose commonly given to a person not accustomed to it. It is of the same strength nearly as ordered in the different Pharmacopœias. The London College formerly employed purified opium, for which they have now properly substituted crude opium, both as it was without any advantage to use purified opium in a preparation in which the crude opium is necessarily freed from its impurities, while it added considerably to the expence, and as the purified opium itself is variable in strength.

Laudanum, as this tincture is named, is given in all those cases in which opium is usually administered, and is preferred to it as being more speedy in its operation, more manageable in its dose, and more convenient for combination with other remedies. Where the stomach is in an irritable state, so as to be easily excited to vomiting, or where the operation of the opium is wished to be exerted more slowly, or more peculiarly on the intestinal canal, as in diarrhœa and spasmodic colic, it is given in the solid state, and usually in the form of pill. Formerly laudanum was prepared with an addition of aromatics, an addition probably useful in obviating nausea, or even the subsequent debilitating operation on the stomach. In prescribing it, an aromatic tincture may be advantageously combined with it. Externally the tincture is occasionally applied locally as a stimulant and anodyne.

TINCTURA OPII AMMONIATA; *olim, Elixir Paregoricum.* Ammoniated Tincture of Opium. Ed.

Take of Benzoic Acid, English Saffron, of each three drachms; Opium, two drachms; Volatile Oil of Anise, half a drachm; Ammoniated Alkohol, sixteen ounces. Digest for seven days in a shut phial, and strain through paper.

This formula is designed as the improvement of a preparation which has long been medicinally employed under the name of Paregoric Elixir, and which, as a weak and pleasant opiate, has in particular been used as a remedy in catarrh. The formula, however, is but ill contrived. While the ammonia can add nothing to the efficacy of the preparation, its pungency renders it ungrateful; and the tincture approaches too nearly in strength to the common tincture of opium. The Paregoric Elixir of the London Pharmacopœia, and which has also a place in the Dublin Pharmacopœia, (Tinct. Opii Camphorata, to be afterwards noticed), is better adapted to the purposes for which it is designed. The composition of the Edinburgh College contains a grain of opium in a drachm, and this is its medium dose. The other does not contain more than a grain in half an ounce.

The operation of the opium cannot be much influenced by the substances with which it is combined in this formula. The common application of it is as a remedy in catarrhal affections. Its dose is from half a drachm to a drachm, taken generally at bed-time.

Tinctura rhei palmati. Tincture of Rhubarb. Ed.

Take of the Root of Rhubarb, three ounces; Lesser Cardamom Seeds, half an ounce; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

Tinctura rhei. Tincture of Rhubarb. Lond.

Take of Rhubarb Root cut, two ounces; Cardamom Seeds bruised, half an ounce; Saffron, two drachms; Proof-spirit, two pints. Macerate for fourteen days, and strain.

Tinctura rhei. Tincture of Rhubarb. Dub.

Take of Rhubarb Root cut, two ounces; Cardamom Seeds freed from the capsules and bruised, Liquorice cut, of each half an ounce; Saffron, two drachms; Proof-spirit, two pints. Digest seven days, then strain.

Proof-spirit extracts nearly all the active matter of rhubarb, and this tincture therefore has all its powers. It is sometimes prescribed in dyspeptic affections and in diarrhœa, in a dose from half an ounce to an ounce.

TINCTURA RHEI ET ALOES; *olim, Elixir Sacrum.* Tincture of Rhubarb with Aloes. Ed.

Take of the Root of Rhubarb cut, ten drachms; Socotorine Aloes, six drachms in powder; Lesser Cardamom Seeds bruised, half an ounce; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

The cathartic power of the rhubarb is in this tincture increased by combination with the aloes. It is employed as a stimulating aperient and purgative, in a dose from half an ounce to an ounce, frequently also as an emmenagogue.

TINCTURA RHEI ET GENTIANÆ; *olim Tinctura Rhei Amara.* Tincture of Rhubarb with Gentian. Ed.

Take of Root of Rhubarb, two ounces; Gentian Root, half an ounce; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

This combination of gentian with rhubarb is supposed to render it a more useful remedy in dyspeptic cases; but the power of the one is so inconsiderable, compared with that of the other, that no important advantage is gained from it. Its dose is from two to four drachms.

TINCTURA SAPONIS, *vulgo Linimentum Saponaceum.* Tincture of Soap. Ed.

Take of Soap, four ounces; Camphor, two ounces; Volatile

Oil of Rosemary, half an ounce; Alkohol, two pounds. Digest the soap in the alkohol for three days; then add the camphor and oil to the strained liquor, agitating it.

LINIMENTUM SAPONIS COMPOSITUM. Compound Soap Liniment. Lond.

Take of Hard Soap, three ounces; Camphor, an ounce; Spirit of Rosemary, a pint. Dissolve the camphor in the spirit, then add the soap, and macerate in a sand bath until it is dissolved.

LINIMENTUM SAPONIS. Soap Liniment. Dub.

Take of Soap, three ounces; Camphor, one ounce; Spirit of Rosemary, a pint. Digest the soap in the spirit of rosemary until it is dissolved; then add the camphor.

This is a stimulant of considerable efficacy, and is in common use as an external application, by friction, in strains and rheumatic pains.

TINCTURA SAPONIS CUM OPIO; *olim, Linimentum Anodynum.* Tincture of Soap with Opium. Ed.

This is made in the same manner, and from the same ingredients, as the tincture of soap; only adding at first one ounce of opium.

It is used for the same purpose as the preceding tincture, and from the addition of the opium has also more power as an anodyne in rheumatism and spasms of the muscles. It is frequently successful in relieving pain by topical application, though the relief is often only temporary.

TINCTURA SENNÆ COMPOSITA; *olim, Elixir Salutis.* Tincture of Senna. Ed.

Take of the Leaves of Senna, two ounces; Root of Jalap, one ounce; Coriander Seeds, half an ounce; Diluted Alkohol, three pounds and a half. Digest for seven days, and to the tincture strained through paper add four ounces of Refined Sugar.

TINCTURA SENNÆ. Tincture of Senna. Lond.

Take of the Leaves of Senna, three ounces; Caraway Seeds bruised, three drachms; Cardamom Seeds bruised, one drachm; Resins freed from the stones, four ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA SENNÆ. Tincture of Senna. Dub.

Take of Leaves of Senna, a pound; Caraway Seeds, an ounce and a half; Cardamom Seeds freed from their Capsules and bruised, half an ounce; Proof-spirit, a gallon. Digest fourteen days, and strain.

This forms a very excellent purgative tincture, less unpleasant in its taste than any of the other cathartic tinctures, not liable therefore to excite nausea, and at the same time operating with sufficient effect. Its dose is one ounce or ten drachms. In the London and Dublin Pharmacopœias being prepared without the jalap, it is less active.

TINCTURA TOLUIFERÆ BALSAMI; *olim, Tinctura Tolutana.* Tincture of Tolu Balsam. Ed.

Take of Balsam of Tolu, one ounce and a half; Alkohol, one pound. Digest until the balsam is dissolved, and strain through paper.

TINCTURA BALSAMI TOLUTANI. Tincture of Balsam of Tolu. Dub.

Take of Tolu Balsam, an ounce; Rectified Spirit, a pint. Digest until the balsam is dissolved; then strain.

The tolu balsam is entirely soluble in alkohol; but as it is a substance of no activity, this tincture is scarcely used but on account of its flavour, and for making the syrup of tolu, according to the formula of the Edinburgh Pharmacopœia.

TINCTURA VERATRI ALBI. Tincture of White Hellebore. Ed.

Take of White Hellebore Root, eight ounces; Diluted Alkohol, two pounds and a half. Digest for seven days, and strain through paper.

White hellebore is a medicine scarcely ever prescribed internally, its operation is so violent. The dose of this tincture cannot exceed a few drops. Neither is it used as an external application. According to Mr Moore, a tincture of it, or rather a medicated wine, is the basis of the empirical preparation, the Eau Medicinale, lately celebrated in gout.

THE following Tinctures are peculiar to the London and Dublin Pharmacopœias.

TINCTURA AURANTII. Tincture of Orange-Peel. Lond.

Take of Fresh Orange-Peel, three ounces; Proof-spirit, two pints. Digest for fourteen days, and strain.

TINCTURA AURANTII. Tincture of Orange-Peel. Dub.

Take of Fresh Orange-Peel, three ounces; Proof-spirit, two pints. Digest for three days, and strain.

The alkohol is in this tincture impregnated with the flavour and bitterness of the orange-peel, and it may be used as communicating flavour, or in combination with more powerful bitters.

TINCTURA CAMPHORÆ COMPOSITA. Compound Tincture of Camphor. Lond.

Take of Camphor, two scruples; Hard Opium in powder, Acid of Benzoin, of each one drachm; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA OPII CAMPHORATA; *sive Elixir Paregoricum.* Camphorated Tincture of Opium, or Paregoric Elixir. Dub.

Take of Hard Purified Opium in powder, Benzoic Acid, of each a drachm; Camphor, two scruples; Essential Oil of Anise, a drachm; Proof-spirit, two pints. Digest for two days; then strain.

This is the tincture which has been known under the name of Paregoric Elixir, and is in common use as a mild opiate in catarrh. Half an ounce of it contains a grain of opium, and its usual dose is two tea-spoonfuls, taken at bed-time. It is inferior in strength to the tincture which has a place in the Edinburgh Pharmacopœia, under the same popular name of Paregoric Elixir, the Ammoniated Tincture of Opium, but it is less pungent and stimulating, and is hence frequently preferred to the other. The London College have given it its present name, rather than the former one, of Tinctura Opii Camphorata, to lessen the risk of its being confounded with Tincture of Opium, in prescribing it, and they have omitted the Oil of Anise, as its odour is rather ungrateful.

TINCTURA CAPSICI. Tincture of Capsicum. Lond.

Take of Capsicum Berries, an ounce; Proof-spirit, two pints. Macerate for fourteen days, and strain.

Under this form capsicum may be employed as a stimulant and stomachic; and diluted, it may afford an easy mode of forming the capsicum gargle, which is employed in some forms of cynanche, half an ounce being added to eight ounces of water.

TINCTURA CARDAMOMI COMPOSITA. Compound Tincture of Cardamom. Lond.

Take of Cardamom Seeds, Caraway Seeds, Cochineal, of each beat to powder, two drachms; Cinnamon Bark bruised, half an ounce; Raisins freed from the stones, four ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA CARDAMOMI COMPOSITA. Compound Tincture of Cardamom. Dub.

Take of Cardamom Seeds freed from their capsules, and bruised, Cochineal in powder, Caraway Seeds bruised, of each two drachms; Cinnamon Bark bruised, half an ounce; Proof-spirit, two pints. Digest for fourteen days; then strain.

This tincture may be employed as a grateful aromatic and carminative.

TINCTURA CASCARILLÆ. Tincture of Cascarilla. Lond.

Take of Cascarilla Bark, four ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA CASCARILLÆ. Tincture of Cascarilla. Dub.

Take of Cascarilla Bark in coarse powder, four ounces; Proof-spirit, two pints. Digest for seven days; then strain.

Cascarilla is so little employed in modern practice, that there is scarcely any advantage in having its tincture as an officinal preparation.

TINCTURA CINCHONÆ COMPOSITA. Compound Tincture of Peruvian Bark. Lond.

Take of Pale Peruvian Bark beat to powder, two ounces; Dried Orange-Peel, an ounce and a half; Virginian Snake-Root bruised, three drachms; Saffron, one drachm; Cochineal, two scruples; Proof-spirit, twenty fluidounces. Macerate for fourteen days, and strain.

TINCTURA CINCHONÆ COMPOSITA. Compound Tincture of Peruvian Bark. Dub.

Take of Peruvian Bark in coarse powder, two ounces; Orange-Peel dried, half an ounce; Virginian Snake-Root, three drachms;

Saffron, a drachm; Cochineal in powder, two scruples; Proof-spirit, twenty ounces by measure. Digest for fourteen days; then strain.

This is the composition which has been known under the name of Huxham's Tincture of Bark. It is more grateful than the simple tincture, and, from the substances added to the cinchona, is probably a better stomachic. It is principally in dyspeptic affections that it is employed, in a dose of two drachms taken occasionally: the powers of the menstruum render its continued use hurtful.

TINCTURA HUMULI. Tincture of Hop. Lond.

Take of Hops, five ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

Hop having been introduced as a narcotic, designed to be employed as a substitute for opium, in cases where, from idiosyncrasy or other causes the latter cannot be employed, the tincture affords a convenient form for its administration. It has been supposed to be nearly of the same strength as tincture of opium, but it requires in general to be given in a dose of from half a drachm to a drachm, to produce much sensible effect.

TINCTURA RHEI COMPOSITA. Compound Tincture of Rhubarb. Lond.

Take of Root of Rhubarb cut, two ounces; Liquorice Root bruised, half an ounce; Ginger Root cut, Saffron, of each, two drachms; Water, a pint; Proof-spirit, twelve fluidounces. Macerate for fourteen days, and strain.

The principle in which the purgative quality of rhubarb resides, has been supposed to be more completely dissolved by water than by other solvents; hence a larger proportion of water is prescribed in the formula for this tincture than usual, and the quantity of alkohol is little more than is necessary to prevent spontaneous decomposition. Its medium dose as a purgative is an ounce.

TINCTURA SCILLÆ. Tincture of Squill. Lond.

Take of Squill Root, recently dried, four ounces; Proof-spirit, two pints. Digest for fourteen days, and strain.

TINCTURA SCILLÆ. Tincture of Squill. Dub.

Take of Squill Root, recently dried, four ounces; Proof-spirit, two pints. Digest for seven days, then put aside, and when the impurities have subsided, pour off the pure liquor.

Squill, when employed as a diuretic, operates most effectually in substance: as an emetic or expectorant it is usually given under the form of the vinegar or syrup, the vinegar dissolving sufficiently its active matter, and correcting its nauseous taste. It is not apparent what particular advantage is to be derived from a tincture of it,—a preparation in which the acrimony of the squill must be very imperfectly covered. The dose of this tincture is from twenty to sixty drops.

TINCTURA VALERIANÆ. Tincture of Valerian. Lond.

Take of Valerian Root, four ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA VALERIANÆ. Tincture of Valerian. Dub.

Take of Valerian Root in coarse powder, four ounces; Proof-spirit, two pints. Digest for seven days; then strain.

The active matter of the valerian is sufficiently extracted by diluted alkohol. The powers of the menstruum, however, probably exceed those of the dissolved matter, and hence this tincture cannot be employed with much advantage.

TINCTURA VALERIANÆ AMMONIATA. Ammoniated Tincture of Valerian. Lond.

Take of Valerian Root, four ounces; Aromatic Spirit of Ammonia, two pints. Macerate for fourteen days, and strain.

TINCTURA VALERIANÆ AMMONIATA. Ammoniated Tincture of Valerian. Dub.

Take of Valerian in powder, two ounces; Spirit of Ammonia, a pint. Digest for seven days, then strain.

This tincture is more powerful than the preceding one, from the impregnation of ammonia. It is given in hysteria, in a dose of from one to two drachms.

TINCTURA ZINGIBERIS. Tincture of Ginger. Lond.

Take of Ginger Root cut, two ounces; Proof-spirit, two pints. Macerate for fourteen days, and strain.

TINCTURA ZINGIBERIS. Tincture of Ginger. Dub.

Take of Ginger Root reduced to a coarse powder, two ounces; Proof-spirit, two pints. Digest for seven days, then strain.

This tincture contains the pungency of the ginger, and may be used as an aromatic, to cover the taste or flavour, or promote the operation of more active remedies. To obviate flatulence, ginger is generally taken in substance.

TINCTURA ANGUSTURÆ. Tincture of Angustura. Dub.

Take of the Bark of Angustura in coarse powder, two ounces; Proof-spirit, two pints. Digest for seven days; then strain.

Diluted alkohol dissolves the active matter of angustura; and under this form it has been sometimes given in dyspepsia, in a dose of two drachms occasionally.

TINCTURA GALBANI. Tincture of Galbanum. Dub.

Take of Galbanum cut into small pieces, two ounces; Proof-spirit, two pints. Digest them for seven days; then strain.

This tincture has sometimes been used in hysteria, and to obviate flatulence in a dose of two or three drachms. It can scarcely be supposed to have any power.

TINCTURA GALLARUM. Tincture of Galls. Dub.

Take of Galls in powder, four ounces; Proof-spirit, two pints. Digest for seven days; then strain.

This tincture will contain the astringency of the galls, but it scarcely admits of being applied to any important use.

TINCTURA MOSCHI. Tincture of Musk. Dub.

Take of Musk in powder, two drachms; Rectified Spirit, one pint. Digest for seven days; and strain.

This tincture can be employed only to communicate the odour of musk; and is therefore of little importance.

TINCTURA QUASSIÆ. Tincture of Quassia. Dub.

Take of the wood of Quassia rasped, one ounce; Proof-spirit, two pints. Digest for seven days; then strain.

The bitterness of quassia may be sufficiently extracted in this preparation. These bitter tinctures appear, however, to be unnecessarily multiplied in the pharmacopœias, especially as, from the action of the menstruum on the stomach, the form of tincture is not the best for the administration of this class of remedies.

## CHAP. XIV.

### EXTRACTA.—EXTRACTS.

Extracts are preparations obtained by digesting or boiling vegetable substances in water, alkohol, or proof-spirit. The menstruum dissolves the active matter of the vegetable; the tincture or decoction is strained, and is evaporated until a mass of a stiff consistence is obtained. This is named an Extract; and either a watery or spirituous extract, as water or alcohol, has been employed as the menstruum. If water has been used, the mucilage, extract, tannin, saccharine, and saline parts of the vegetable remain in the extract; if alkohol, the resin is its principal component part; and if proof-spirit, all the fixed principles which water and alkohol are separately capable of dissolving, are obtained.

It is evident, therefore, that the same mode of preparing these extracts is not applicable to every vegetable substance. Where the virtues depend principally on the extract or tannin which the substance contains, the watery extract will be proper; while if it depend on a resinous part, the spirituous extract only will possess its virtues.

It is to be observed, however, that in the preparation of these extracts, the virtues of the substances are almost always injured to a certain extent. The essential oil, on which their flavour and aromatic quality depend, are dissipated; and in the preparation of the watery extracts, there is generally a partial decomposition of the active matter, by the necessary decoction. This preparation, therefore, is not now very frequently employed; and with the exception of some of the pure bitters, as gentian, or some of the saccharine vegetables, as liquorice, there is no medicine, perhaps, but what may be given with more advantage under some other form.

The Edinburgh and Dublin Colleges preserve the distinction of Watery and Spirituous Extracts: the London College do not observe it; and they have farther associated with what are more strictly named Extracts, the inspissated juices of vegetables, the consistence of these being similar, and the only circumstance in which they differ, that, in the one, the matter naturally dissolved in the juice of the plant, in the other, the matter extracted by the operation of a solvent, is obtained, is not, it has been conceived, sufficiently important to constitute a distinction between them. I have adhered, however, to the arrangement of the Edinburgh Pharmacopœia, and under the Chapter of Inspissated Juices, have already introduced those which are peculiar to the London Pharmacopœia.

## 1.—EXTRACTA PER AQUAM.—EXTRACTS BY WATER. Ed.

## EXTRACTA SIMPLICIORA.—MORE SIMPLE EXTRACTS. Dub.

The directions for preparing these are given in the Edinburgh Pharmacopœia, under the Extract of Gentian.

Take of Gentian Root, any quantity. Pour on it cut and bruised, eight times its weight of Distilled Water. Boil to one half, and expressing it strongly, strain the liquor. Reduce the boiled liquor immediately to the consistence of thick honey, by evaporation in a bath of boiling water, saturated with muriate of soda.

The Dublin College give the following general directions:

The Simpler Extracts, unless it be otherwise ordered, are to be prepared according to the following formula: Boil the vegetable matter in eight times its weight of water, to the consumption of half the liquor; then express the liquor, and after the impurities have subsided, strain it; evaporate with a heat of from 200° to 212°, until it begin to thicken; lastly, inspissate it with a heat of from 100° to 200°, stirring frequently, until it attain a consistence fit for forming pills.

The directions in the London Pharmacopœia are in part given under the individual extracts; and partly under the following general formula:

In preparing all Extracts, evaporate as quickly as possible, in a shallow open vessel by a water bath, until the consistence be such as is fit for forming pills, and towards the end, stir constantly with a spatula. Sprinkle on all the softer extracts a little spirit of wine.

EXTRACTUM GENTIANÆ. Extract of Gentian. Ed. Lond. Dub.

This extract, (the formula for preparing which, according to the Edinburgh Pharmacopœia, is given above, and which is prepared in a similar mode according to the directions in the other Pharmacopœias), is intensely bitter, the quality of bitterness appearing in general not to be injured by decoction or evaporation. It is sometimes used to form other medicines into pills, especially those with which it coincides in medicinal virtue.

EXTRACTUM FLORUM ANTHEMIDIS NOBILIS. Ed. EXTRACTUM ANTHEMIDIS. Lond. EXTRACTUM FLORUM CHAMÆMELI. Dub. Extract of Chamomile.

The bitterness of chamomile is rendered rather ungrateful in its infusion by the flavour of its essential oil. This is entirely dissipated by decoction, and the extract is therefore a pure and grateful bitter. It is scarcely applied, however, to any use.

EXTRACTUM FOLIORUM CASSIÆ SENNÆ. Ed. Extract of Senna Leaves.

Senna has its activity much impaired by decoction. The extract, therefore, cannot be a proper preparation of it. It is accordingly uncertain and inactive, and is never used.

EXTRACTUM RADICIS GLYCYRRHIZÆ GLABRÆ. Ed. EXTRACTUM GLYCYRRHIZÆ. Lond. Dub. Extract of Liquorice.

The soluble matter of this root appears to be chiefly sugar and mucilage, and it suffers, therefore, little or no injury in this extraction of it by water, or in the subsequent evaporation. The extract is usually prepared on a large scale, and much of it is imported into this country. It is often, however, in an impure state. Purified by solution in water, straining and evaporation, or prepared with care from the root itself, and evaporated nearly to dryness, it forms the Refined Liquorice of the shops. Under this form it is in common use as a demulcent in catarrh.

EXTRACTUM LIGNI HÆMATOXYLI CAMPECHENSIS. Ed. EXTRACTUM HÆMATOXYLI. Lond. EXTRACTUM SCOBIS HÆMATOXYLI. Dub. Extract of Logwood.

The astringency of the logwood is obtained with no sensible injury in this extract. It has been proposed to be employed as an astringent, but has never been established in use. Its dose is from ten to twenty grains.

EXTRACTUM RADICIS HELLEBORI NIGRI. Ed. Dub. Extract of the Root of Black Hellebore.

This extract has been employed as a cathartic, principally in mania, and as an emmenagogue in a dose from five to fifteen grains, but it is uncertain in strength. The spiritous extract which has a place in some of the foreign Pharmacopœias, is a more active preparation. It has been used as a hydragogue cathartic, and is the basis of Baccher's tonic pills, once highly celebrated in the treatment of dropsy.

EXTRACTUM CAPITUM PAPAVERIS SOMNIFERI. Ed. EXTRACTUM PAPAVERIS. Lond. Extract of Poppy.

This extract of the capsule of the poppy retains, to a certain extent, its narcotic quality, but usually so far weakened as to leave it uncertain in strength. It is therefore scarcely used. The Syrup of Poppy is sometimes prepared from it, by dissolving a drachm of the extract in a pint of water, and boiling this with the due proportion of sugar.

EXTRACTUM FOLIORUM RUTÆ GRAVEOLENTIS. Ed. EXTRACTUM FOLIORUM RUTÆ. Dub. Extract of the Leaves of Rue.

As any medicinal virtue belonging to rue resides in its essential oil, this extract must be an injudicious preparation. It has been given in amenorrhœa, in a dose of from ten to fifteen grains; but it has probably no power.

The following Watery Extracts have a place in the London, or the Dublin Pharmacopœia:

EXTRACTUM ALOES. Extract of Aloes. Lond.

Take of Socotorine Aloes in powder, half a pound; Boiling Water, four pints. Macerate for three days, with a gentle heat; then strain, and put aside, that the impurities may subside. Pour off the purified liquor, and evaporate until it attain a proper consistence.

The object of this preparation is principally to obtain an extract with less resin than is usually contained in aloes: this, it has been affirmed, is equally powerful as a purgative, and is less stimulating and more grateful. Its dose is ten or fifteen grains.

EXTRACTUM CINCHONÆ. Extract of Cinchona. Lond. Dub.

Take of Pale Peruvian Bark bruised, a pound; Water, a gallon. Boil to six pints, and strain the liquor while warm. In the same manner, boil it four times in the same quantity of water, and strain. Having mixed the liquors, evaporate until a proper consistence is attained. This extract ought to be kept *Soft*, so as to be fit for forming pills, and *Hard*, so as to be reduced to powder. (These are the directions in the London Pharmacopœia, in the other they are essentially the same.

The active matter of Peruvian Bark is of an extractive and resinous nature, and is more soluble in alkohol than in water. Water, however, when aided by heat, is capable of dissolving the greater part of it; and as a great part of the substance of the bark consists of inert ligneous matter, it might be supposed that some advantage is derived from thus separating the more active principles. During the boiling and evaporation, however, they suffer a chemical change to a certain extent, analogous to that which takes place in several varieties of vegetable matter exposed in a humid state, and at an elevated temperature, to the action of the air, and the nature of which, so far as it has been determined, has been already explained, (page 54.). Hence the extract obtained is not equal in efficacy to the quantity of bark from which it has been prepared. Its medium dose is ten grains, which is supposed equivalent to half a drachm of cinchona in substance.

EXTRACTUM COLOCYNTHIDIS. Extract of Colocynth. Lond.

Take of the Pulp of Colocynth, one pound; Water, a gallon. Boil to four pounds, and strain the liquor while warm; then reduce it by evaporation to the proper consistence.

The active matter of colocynth is so far dissolved by water, by decoction, that the extract has a cathartic quality. It is less powerful, however, and has been supposed to be less irritating than the pulp itself. Its dose is from six to ten grains.

EXTRACTUM COLOCYNTHIDIS COMPOSITUM. Compound Extract of Colocynth. Lond. Dub.

Take of the Pulp of Colocynth cut, six drachms; Socotorine Aloes in powder, an ounce and a half; Scammony in powder, half an ounce; Cardamom Seeds in powder, a drachm; Hard Soap, three drachms; Boiling Water, two pints. Macerate the pulp of colocynth in the water, with a gentle heat for four days. Strain the liquor, and add to it the aloes, scammony and soap; then evaporate until it attain a proper consistence, and towards the end of the evaporation mix in the cardamom seeds.—The process in the Dublin Pharmacopœia is the same, except that a pint of water only is ordered; but as the same consistence is attained by evaporation, this probably gives rise to no diversity of strength.

This is the officinal preparation which has long had a place in the Pharmacopœias, under the name of Extractum Catharticum. It is a combination of the more powerful cathartics; and as these operate more effectually, and with less irritation, when combined, than when one only in a large dose is employed, the composition is well adapted for administration in cases where it is difficult to excite purging. It used formerly to be prepared by employing diluted alkohol as the solvent, not only of the colocynth, but also of the resinous substances, and evaporating the solution: the present method is more economical. The extract is usually given in doses of from five to ten or fifteen grains, repeated at short intervals, until it produce purging. Its power may also be safely promoted by adding a portion of calomel.

EXTRACTUM HUMULI. Extract of Hop. Lond.

Take of Hops, half a pound; Water, a gallon. Boil to four pints, and strain the liquor while it is hot; then reduce it by evaporation to the proper consistence.

Hop has been introduced into practice as a narcotic, possessing also from its bitterness a degree of tonic power. The bitterness will be obtained in this extract; but it is probable that the narcotic power is impaired, and that in this property it will not be uniform in strength. The dose of this extract is from five to fifteen grains.

EXTRACTUM OPII. Extract of Opium. Lond.

Take of Opium cut into pieces, half a pound; Water, three pints. Add to the opium a small quantity of the water, and macerate for twelve hours that it may become soft; then add gradually the remaining water; triturate until they are intimately mixed, and put aside that the impurities may subside; then strain the liquor, and evaporate it to the proper consistence.

EXTRACTUM OPII AQUOSUM. Watery Extract of Opium. Dub.

Take of Opium, two ounces; Boiling Water, a pint. Rub the opium with the water for ten minutes, and after a little time pour off the liquor; rub the remaining opium with an equal quantity of boiling water for the same time, and in like manner pour off the liquor: Repeat this a third time; then mix the liquors, and expose the mixture to the air in an open vessel for two days. Lastly, strain through linen, and by gentle evaporation form an extract.

Any process of this kind designed to purify opium is altogether superfluous, for the impurities of the opium of commerce are inconsiderable, and neither alter its powers nor add materially to its bulk. And if such processes are designed to correct any of the qualities of the opium, whence the unpleasant symptoms which sometimes follow from its administration are supposed to arise, they probably rest on inaccurate views of its operation. The active matter of opium is not entirely extracted by water; in the present process, therefore, the product must differ from the crude opium, and it would require clinical experience more extensive and accurate than we yet have to ascertain correctly its real powers. It must besides be altered, and rendered at the same time uncertain in strength, by the chemical change which it will suffer during its inspissation. Even when the active principles of the opium have been extracted by diluted alkohol, (the method which was formerly followed in the process of the Pharmacopœia,) though the solvent is more powerful, requires less heat for its evaporation, and counteracts to a certain extent the action of the air, the inspissated mass is found to be inferior in strength to opium in its impurified state, and this must be still more the case in the present process, where water only is employed. It is a process, therefore, the propriety of which is extremely doubtful.

Extractum rhei. Extract of Rhubarb. Lond.

Take of the Root of Rhubarb bruised, one pound; Diluted Alkohol, a pint; Water, seven pints. Macerate for four days with a gentle heat, then strain and put aside the liquor, that the impurities may subside; pour it off when clear, and reduce it by evaporation to the proper consistence.

The purgative power of rhubarb is usually supposed to be more peculiarly extracted by water, and it may therefore be obtained by this process. It will equally be obtained, however, in the simple infusion, which, as being an extemporaneous preparation, is preferable to this extract, which, besides the change that may be produced during the inspissation, must be farther liable to decomposition when kept in a soft state.

Extractum sarsaparillæ, Extract of Sarsaparilla. Lond.

Take of Sarsaparilla Root cut, a pound; Boiling Water, a gallon. Macerate for twenty-four hours, then boil to four pints, and strain the liquor while warm; lastly, reduce it by evaporation to the proper consistence.

Sarsaparilla being usually given under the form of watery decoction, there appears to be no particular advantage in preparing from this an extract, as the decoction may be brought to any state of concentration, by using an increased proportion of the root, or continuing the boiling for a longer time. And a watery mucilaginous extract as this is, besides the injury it will probably suffer in its inspissation, will farther be liable to spontaneous decomposition on keeping, and is therefore unfit for an officinal preparation.

Extractum taraxaci. Extract of Dandelion. Lond. Dub.

Take of the fresh Root of Dandelion bruised, a pound; Boiling Water, a gallon. Macerate for twenty-four hours, then boil to four pints, and strain the liquor while hot; lastly, evaporate it to the proper consistence.

The recent root of dandelion has been ranked as an aperient and diuretic. The expressed juice, or decoction of the root, has been employed as a remedy in dropsy, biliary obstructions and induration of the liver; and, according to Bergius, has proved frequently successful where other remedies had failed. Whatever may be the powers of the plant, it may be doubted if the form of the watery extract be the best for its administration.

EXTRACTUM VALERIANÆ. Extract of Valerian. Dub.

Take of Valerian Root in coarse powder, six ounces; Boiling Water, three pints. Digest for twenty-four hours in a close vessel with a moderate heat; press out the liquor, and reduce it to a proper consistence by evaporation.

The medicinal powers of valerian appear to be connected with the principle in which its odour resides, and as this must be in a great measure dissipated by evaporation, it may be doubted if this is a form of preparation properly adapted. It can at least have no advantage over the extemporaneous infusion or decoction.

The following Watery Extracts, peculiar to the Dublin Pharmacopœia, are prepared according to the general formula already inserted.

EXTRACTUM CACUMINUM ABSINTHII. Extract of the Tops of Wormwood. Dub.

This extract is intensely bitter, and the unpleasant odour of the plant is dissipated during the evaporation. It may be substituted medicinally for extract of gentian. It is sometimes used, instead of hops, to give bitterness to fermented liquors.

EXTRACTUM CACUMINUM GENISTÆ. Extract of Broom-tops. Dub.

The infusion of the tops of the broom has a degree of diuretic power, whence it has been employed as a remedy in dropsy. The extract can scarcely be supposed to have much power, and it is now expunged from the Edinburgh Pharmacopœia, where it formerly had a place.

EXTRACTUM RADICIS JALAPÆ. Extract of Jalap Root. Dub.

The active matter of jalap is partly resinous, and must therefore be imperfectly extracted by water. The extract thus prepared may be milder than the root, but will be liable to be uncertain in strength. A resinous extract is prepared by the action of diluted alkohol, which has a place in all the Pharmacopœias, and which must be a more active preparation, though neither of them probably is of much utility.

EXTRACTUM CORTICIS QUERCUS. Extract of Oak Bark. Dub.

In this extract the astringency of the oak bark will be obtained probably with little injury, and, consisting principally of tannin, it will not be very liable to spontaneous decomposition. It can have scarcely any advantage, however, but what may be equally obtained from the decoction.

EXTRACTUM FOLIORUM SABINÆ. Extract of Leaves of Savin. Dub.

The medicinal powers of this herb seem in a great measure to depend on its essential oil, and as this must be dissipated during the evaporation, the extract must be comparatively an inactive preparation. It is never used.

## II.—EXTRACTA PER AQUAM ET ALKOHOL.—EXTRACTS BY WATER AND ALKOHOL. ED.

## EXTRACTA RESINOSA.—RESINOUS EXTRACTS. DUB.

THE directions for preparing these, in the Edinburgh Pharmacopœia, are given under the first of them, the Extract of Bark.

EXTRACTUM CINCHONAE OFFICINALIS. Extract of Peruvian Bark. Ed.

Take of Peruvian Bark in powder, one pound; Alkohol, four pounds. Digest for four days, and pour off the tincture. Boil the residuum in five pounds of distilled water for a quarter of an hour, and strain the decoction while hot through linen. Repeat this boiling and straining with an equal quantity of distilled water, and reduce the liquor by evaporation to the consistence of thin honey. Draw off the alkohol from the tincture by distillation, until it is reduced to a similar consistence. Then mix the liquors thus inspissated, and reduce to a proper consistence by evaporation in a bath of boiling water, saturated with muriate of soda.

EXTRACTUM CINCHONÆ RESINOSUM. Resinous Extract of Bark. Lond.

Take of Peruvian Bark bruised, a pound; Rectified Spirit, four pints. Macerate for four days, and strain. Let the tincture be distilled from a water-bath until it is of a proper consistence.

EXTRACTUM CINCHONÆ RUBRÆ RESINOSUM. Resinous Extract of Red Bark. Dub.

Is to be prepared in the same manner as the Resinous Extract of Cascarilla.

This preparation will probably be more active than the watery extract of bark already noticed. By the joint action of the alkohol and water, all the principles of the bark are extracted, and nothing remains but the inert ligneous fibre. And in the subsequent evaporation, the dissolved matter suffers less injury, partly from less heat being required to bring it to the due consistence, and partly perhaps from the alkohol resisting the oxygenation or decomposition of the extract. It is, however, much more expensive; and the extract of bark to be found in the shops is almost always that which is prepared by the other formula. The dose of the spiritous extract is ten grains, and it affords a very convenient vehicle for combining bark with the more active preparations of iron in the form of pill.

EXTRACTUM RADICIS CONVOLVULI JALAPÆ. Extract of Jalap. Ed.

This is ordered in the Edinburgh Pharmacopœia to be prepared in the same manner as the Extract of Bark, and, as prepared in the same mode, it has a place in the Dublin Pharmacopœia. The London College gives the following process, which is somewhat different.

Take of the Root of Jalap bruised, one pound; Rectified Spirit, four pints; Water, ten pints. Macerate the jalap root in the spirit for four days, and pour off the tincture. Boil the residuum with the water to two pints. Then strain the tincture and the decoction separately: evaporate the latter, and distil the former until each begin to become thick. Lastly, mix the extract with the resin, and evaporate to the proper consistence. This extract is to be kept *soft*, so that it may be fit to form pills, and *hard* that it may be rubbed into powder.

In the preparation of this extract, both the resinous and mucilaginous parts of the jalap root are dissolved, and it is therefore a more active preparation than the watery extract of jalap already noticed. It exerts its cathartic operation fully in a dose of ten or twelve grains, but it has no particular advantage, and is seldom employed.

Besides these, there are other two spiritous extracts admitted by the Dublin College.

### EXTRACTUM CASCARILLÆ RESINOSUM. Resinous Extract of Cascarilla. Dub.

Take of Cascarilla Bark in coarse powder, a pound; Rectified Spirit of Wine, four pints. Digest for four days, then pour off the tincture and strain. Boil the residuum of the cascarilla in ten pounds of water to two pounds. Evaporate the strained decoction, and distil the tincture from a retort until each become thick; then mix them together, and reduce them by evaporation to a consistence fit for forming pills; lastly, mix both extracts well together.

This extract may contain the active matter of the cascarilla, and may be given as a bitter and tonic, in the dose of a scruple; but there does not appear to be any peculiar advantage in employing this remedy under this expensive form.

### OPIUM PURIFICATUM. Purified Opium. Dub.

Take of Opium cut into small pieces, one pound; Proof-spirit, twelve pints. Digest with a gentle heat, stirring frequently until the opium is dissolved: strain the tincture through paper, and distil from a retort that the spirit may be separated; pour out the remaining liquor, and evaporate until the extract become of a proper consistence. Purified opium is to be kept in two states; one *soft*, so as to be fit for forming pills; the other *hard*, so as to be capable of being reduced to powder.

The objections to the purification of opium by the action of water have been already stated. In the present process, as the power of the solvent is greater, and the degree of heat necessary to evaporate it less considerable, it is probable that the opium will suffer less change. Still we cannot be certain of its real power in this state, and the process is expensive, and altogether superfluous.

# CHAP. XV.

## AQUÆ STILLATITIÆ.—DISTILLED WATERS.

Several of the principles of vegetable matter are so far volatile as to be elevated in vapour at the temperature of 212°; hence when water is distilled from them, it is frequently impregnated with their taste and odour, and sometimes even with their more active powers. The odour, and frequently the pungency of plants reside in their essential oil; and this being always volatile at this temperature, the aromatic plants, in which essential oil is most abundant, communicate these qualities to water distilled from them, a portion of the oil being retained in solution by the water. The acrid principle of some vegetables appears likewise to be so far volatile as to rise in distillation with water; and the prussic acid, in which the narcotic power of the bitter almond, cherry laurel, and similar plants resides, is also obtained by the same process: But these vegetables are comparatively few, and there are no officinal distilled waters having a place in the Pharmacopœias possessed of any important power; they are designed, from their flavour and agreeable pungency, to serve merely as vehicles for the exhibition of more active remedies, and all of them owe these qualities to the essential oil which they hold dissolved.

Recent vegetables are in general more proper for distillation than after being dried, the water they afford being more grateful. They are therefore ordered in this state when they can be procured in it by the Edinburgh and Dublin Colleges. The London College, on the contrary, order them to be used dried, as they cannot be procured fresh at all seasons of the year. When fresh, they in general impregnate sufficiently with their flavour and taste, three times their weight of water; when dry, double that quantity. As much must always be employed, as when drawn off by distillation a sufficient quantity of water shall remain in the still to prevent any part of the vegetable matter being scorched, and communicating empyreuma to the distilled water, the distillation being continued as long as the liquid that condenses has any taste or smell of the vegetable from which it is distilled. The flavour of the more delicate plants is injured by this operation; and these distilled waters are in general less grateful to the stomach than the infusions of the vegetable matter which yields them.

Distilled waters are liable to a species of decomposition, the nature of which has not been well determined. When long kept, they become mucilaginous, and at length quite viscid, and at the same time somewhat sour. According to Bucholz, this change occurs most readily in those distilled waters which contain little essential oil, and it is not dependent on the air, but takes place even more quickly when the water is kept in a closed than in an open vessel. It might be supposed to arise from the presence of a small portion of vegetable matter, besides essential oil held in solution by the water; but according to experiments quoted by Bucholz, it is owing to changes in the oil itself; distilled water, in which essential oil of peppermint, fennel, and other plants was dissolved, becoming mucilaginous and losing their odour in a few weeks. The change of composition in the oil it is possible may be owing to the chemical action of the oxygen of the water. To counteract this change, and preserve distilled waters more effectually in a proper state, a small quantity of alkohol is ordered to be added to them. According to Bucholz, they ought also to be kept in vessels imperfectly closed.

Aqua distillata. Distilled Water. Ed. Lond. Dub.

Distil water in clean vessels until about two-thirds have distilled over.—The same directions nearly are given in the other Pharmacopœias.

Water does not occur in nature perfectly pure, but has generally a sensible impregnation of saline and earthy matter. Spring water, which is purest, contains a little carbonate of lime, and muriates of lime and soda; river water contains sulphate and carbonate of lime, and muriate of soda: and well water, sulphate and carbonate of lime in larger quantity. For some purposes in Pharmacy, it is necessary to use water free from these substances, particularly in the solution of some earthy and metallic salts, several of which are decomposed by them, and if they are given in small doses, may, by such decompositions, be rendered nearly inert. In preparations too, where much water is evaporated, as in the formation of extracts, it has been judged preferable to employ distilled water, as the residual matter of common water will remain mixed with the product of the process, and uselessly add to its bulk, or even in some cases produce in it some chemical change. It is for these purposes that distilled water is ordered in the Pharmacopœias; but except where the use of it is rendered necessary from these circumstances, it ought not to be employed, as from losing in the distillation much of the air that it holds loosely dissolved, it is always vapid and unpleasant. And when directed in pharmaceutical processes, without discrimination, the direction is liable to be altogether neglected by the apothecary.

The process should be conducted with rather a gentle heat, and ought not to be continued longer than until two-thirds of the water have distilled, as otherwise a minute portion of the saline matter might be brought over in the distillation. The first portion too that comes over is directed by the London and Dublin Colleges to be rejected.

The directions for the preparation of the Distilled Water of Plants are given in the Edinburgh Pharmacopœia under the first of them—that of Orange-Peel.

Take of the rhind of the Orange, fresh, two pounds. Add as much water, that when ten pounds have been drawn off by distillation, a sufficient quantity shall remain to prevent empyreuma. After due maceration, distil ten pounds.

In the London and Dublin Pharmacopœias, the water, after maceration on the vegetable matter, if it is dry, is directed to be distilled, allowing so much to remain in the still as will prevent empyreuma. And in all the Pharmacopœias, half an ounce of rectified spirit is ordered to be added to each pound of water after distillation.

AQUA CITRI AURANTII. Water of Orange-peel. Ed.

This distilled water has none of the bitterness of the orange-peel, but merely its flavour, and is so little used, that it is not kept in the shops.

Aqua citri medicæ. Water of Lemon-peel. Ed.—Ten pounds of water are drawn from two pounds of the fresh rhind of the lemon.

This water has merely a slightly agreeable flavour, and is scarcely ever used.

Aqua corticis lauri cassiæ. Water of Cassia Bark. Ed.
Aqua corticis cinnamomi. Ed. Lond. Dub.—Ten pounds or a gallon of water are distilled from a pound of each of these barks.

The cinnamon water only has a place in the London and Dublin Pharmacopœias.

The cassia water, when not prepared too pungent, can scarcely, however, be distinguished from that of the cinnamon, the essential oil of both these barks having a flavour nearly the same. The cassia water, therefore, being less expensive than the cinnamon, is substituted for it in the shops. It has the pungency and aromatic flavour of the cassia, and is hence in common use to cover the ungrateful taste and flavour of other medicines; and not unfrequently is used in too large quantities. It is sometimes given alone as an aromatic and stimulant.

Aqua menthæ piperitæ florentis. Peppermint Water. Ed. (Aq. Menth. Piperit. Lond. Dub.)—Ten pounds of water are drawn by distillation from three pounds of green peppermint.

This water is strongly impregnated with the flavour of the herb, and is very frequently used in mixtures to cover the flavour of other medicines. It is also frequently taken alone as a carminative.

Aqua menthæ pulegii florentis. Pennyroyal Water. (Aq. Pulegii, Lond. Dub.)—Ten pounds of water are distilled from three pounds of the green herb.

Pennyroyal water has a flavour and taste similar to that of peppermint, and is used for the same purposes.

AQUA FRUCTUS MYRTI PIMENTÆ. Pimento Water. (Aq. Piment. Lond. Dub.)—Ten pounds of water are distilled from half a pound of the Jamaica pepper.

This water has the flavour of the Jamaica pepper, and its aromatic quality; but as this is not very grateful, it is not often used.

AQUA PETALORUM ROSÆ CENTIFOLIÆ. Rose Water. (Aq. Rosæ, Lond. Dub.)—Ten pounds of water are drawn from six pounds of the fresh pale rose flowers.

This water has all the flavour of the rose, and as it has no pungency or acrimony, it is often used for external applications, as in solutions of acetate of lead, or sulphate of zinc for collyria.

There are a few Distilled Waters peculiar to the London or the Dublin Pharmacopœias, of so little importance, however, as to require scarcely more than enumeration.

AQUA ANETHI. Distilled Water. Lond.—A gallon of water is distilled from a pound of the seeds.

Its flavour is rather unpleasant, and it has little pungency.

AQUA CARUI. Caraway Water. Lond.—A gallon of water is distilled from a pound of the seeds.

This has a considerable share of aromatic flavour and pungency, and may be employed as a carminative.

AQUA FŒNICULI. Fennel Water. Lond. Dub.—A gallon of water is distilled from a pound of the seeds.

This has merely the weak flavour of the seeds, with little warmth.

AQUA MENTHÆ VIRIDIS. Spearmint Water. Lond. (Aq. Menth. Sativ. Dub.)—A gallon of water is distilled from a pound and a half of the herb.

Its flavour and taste are so similar to those of peppermint or pennyroyal, that it may be regarded as superfluous.

# CHAP. XVI.

## SPIRITUS STILLATITII.—DISTILLED SPIRITS.

Alkohol dissolves the essential oils of vegetables in much larger quantity than water does, and it might therefore be supposed that it may be more strongly impregnated with them by distillation, and hence possess in a much greater degree the aromatic flavour and pungency of the plant from which it is distilled. It is seldom, however, that this is the case; and from many vegetables alkohol acquires by distillation a weaker impregnation than water. This is owing to its greater volatility. All the essential oils are volatilized at a temperature of 212°, and must therefore rise with water in distillation, and impregnate it to the extent in which it can dissolve them. But there are many of them not volatilized at the temperature at which alkohol boils, and when it is distilled, therefore, from the plants containing them, it comes over weakly impregnated with their odour or pungency.

To obviate this, diluted alkohol, or proof-spirit as it is named, is employed in the distillation. It is macerated on the vegetable substance and is then distilled; the alkohol rises first nearly pure, but as the distillation proceeds, the liquor requires a higher temperature to cause it to boil: the vapour therefore is more largely impregnated with the essential oil, and towards the end of the distillation the whole of it is brought over with the last portion of water; and the spirit, which has previously been distilled, being mingled with this, forms a transparent solution. This forms a distilled spirit. There are at least only two officinal spirits in which pure alkohol is the solvent,—the spirit of lavender and spirit of rosemary, the essential oils of these plants being sufficiently volatile to be elevated at the temperature at which alkohol distils.

Distilled spirits are preparations of no great importance. Like the distilled waters they serve as vehicles for the administration of more active medicines, the taste and flavour of which they cover or render more grateful; or they are occasionally employed as grateful stimulants, to relieve nausea or flatulence. The directions for preparing them are given, in the Edinburgh Pharmacopœia, under the first of them, the Spirit of Caraway, and in the London and Dublin Pharmacopœias are almost precisely the same.

Take of Caraway Seeds bruised, half a pound; Diluted Alkohol, nine pounds. Macerate during two days in a close vessel; then add a sufficient quantity of water to prevent empyreuma, and draw off nine pounds by distillation.

In the same manner are prepared the following Spirits, Nine Pounds being drawn from the quantities affixed:

SPIRITUS CORTICIS LAURI CINNAMOMI. Spirit of Cinnamon. Ed. Lond. Dub. (Bark of Cinnamon, one pound).

SPIRITUS MENTHÆ PIPERITÆ FLORENTIS. Spirit of Peppermint. Ed. Lond. Dub. (Herb of Peppermint, one pound and a half).

SPIRITUS NUCIS MYRISTICÆ MOSCHATÆ. Spirit of Nutmeg. Ed. Lond. Dub. (Nutmeg, bruised two ounces).

SPIRITUS FRUCTUS MYRTI PIMENTÆ. Spirit of Pimento. Ed. Lond. Dub. (Fruit of Pimento, bruised, half a pound).

To these may be added the following from the London Pharmacopœia:

Spiritus anisi. Spirit of Anise.
Spiritus menthæ viridis. Spirit of Spearmint.
Spiritus pulegii. Spirit of Pennyroyal.

All these spirits have the aromatic flavour, and to a certain extent the pungency of the vegetables from which they are prepared. They require no particular observations.

Of Compound Spirits, the following have a place in the Pharmacopœias:

Spiritus juniperi compositus. Compound Spirit of Juniper. Ed. Lond. Dub.

Take of Juniper Berries bruised, one pound; Caraway Seeds, Fennel Seeds, of each bruised, one ounce and a half; Diluted Alkohol, nine pounds. Macerate for two days; and, having added as much Water as is sufficient to prevent empyreuma, draw off nine pounds by distillation.

This is a grateful cordial spirit, which has been used as a carminative, and as a stimulant and diuretic in dropsy.

Spiritus anisi compositus. Compound Spirit of Anise. Dub.

Take of Anise Seeds, Angelica Seeds, of each bruised half a pound; Proof-spirit, one gallon; Water as much as is sufficient to prevent empyreuma. Distil one gallon.

This is similar to the preceding spirit, milder and perhaps less grateful. It has been used as a carminative.

Spiritus armoraciæ compositus. Spirit of Horse-radish. Lond. (Spiritus Raphani Compositus. Dub).

Take of fresh Horse-Radish root cut, dried Orange Peel, of each one pound; Nutmegs bruised, half an ounce; Proof-spirit, a gallon; Water, as much as is sufficient to prevent empyreuma. Macerate for twenty-four hours, then distil a gallon with a slow fire.—There was formerly in this composition two pounds of fresh scurvy grass, and this is still retained by the Dublin College.

This compound spirit was once employed as an antiscorbutic. It has justly fallen into disuse.

There remain, lastly, those Distilled Spirits prepared with Pure Alkohol.

SPIRITUS LAVANDULÆ SPICÆ. Spirit of Lavender. Ed. Lond. Dub.

Take of Fresh Lavender Flowers, two pounds; Alkohol, eight pounds. Draw off seven pounds by distillation with the heat of a water-bath.

The oil of Lavender is sufficiently volatile to be elevated with alkohol in vapour, and it is completely dissolved by it. The spirit is used principally as a grateful stimulating perfume, which gives relief in headach, being drawn up the nostrils, or applied to the forehead.

SPIRITUS LAVANDULÆ COMPOSITUS. Compound Spirit of Lavender. Ed. Lond. Dub.

Take of Spirit of Lavender, three pounds; Spirit of Rosemary, one pound; Cinnamon Bark bruised, one ounce; Cloves bruised, two drachms; Nutmeg bruised, half an ounce; Red Saunders Wood rasped, three drachms. Macerate seven days, and strain. (In the formula given by the London College the cloves are omitted).

This tincture is a grateful cordial and stimulant in common use, for relieving languor and faintness. Its dose is thirty or forty drops, taken on a piece of sugar or in a cupful of water.

Spiritus rorismarini officinalis. Spirit of Rosemary. Ed. Lond. Dub.

Take of Fresh Rosemary Tops, two pounds; Alkohol, eight pounds. Draw off seven pounds by distillation by the heat of boiling water.—The London College employ diluted alkohol in the preparation of this spirit.

Spirit of Rosemary is a very fragrant perfume, and is in common use for the same purposes as the simple Spirit of Lavender.

Alkohol. Alkohol. Spiritus Vinosus Rectificatus. Rectified Spirit of Wine.

There is no process given in the Edinburgh Pharmacopœia for the preparation of alkohol. It is supposed to be procured from those who prepare it on a large scale, and is inserted in the catalogue of the articles of the Materia Medica, as of the specific gravity .835, this being a strength at which it can be procured without difficulty, and being sufficient for nearly every purpose to which it requires to be applied in Pharmacy. It is procured of this strength from any of the spiritous liquors of commerce by slow distillation with a gentle heat, a portion of sub-carbonate of potash heated being previously added to abstract the water more effectually from the spirit. It is usually submitted to a second distillation, a little alum being added previous to this, to remove any of the alkali which might be held in solution in the spirit obtained by the first distillation.

The London and Dublin Colleges, while they have also inserted alkohol of this strength, under the name of Rectified Spirit, in the catalogue of the articles of the Materia Medica, have given a process to obtain it more concentrated for particular purposes. The following are the directions in the London Pharmacopœia:

Take of Rectified Spirit, a gallon; Sub-carbonate of Potash, three pounds. To the spirit add a pound of the sub-carbonate of potash previously heated to 300°, and macerate for twenty-four hours, shaking frequently; then to the spirit poured off, add the remaining portion of the sub-carbonate of potash heated to the same degree; lastly, distil the alkohol from a water-bath, and keep it in a vessel well stopt. The specific gravity of alkohol is to that of distilled water as 815 to 1000.

The process in the Dublin Pharmacopœia is nearly the same.

Take of Rectified Spirit, a gallon; of Potashes dried by a heat of 300°, and warm, a pound; of Caustic Potash, an ounce; Muriate of Lime dry, half a pound. Mix the spirit and the potash; add the potashes previously rubbed to powder, and digest the mixture in a close vessel for three days, agitating frequently. To the spirit poured off, add the muriate of lime: distil with a gentle heat, until what remains begins to become thick. The specific gravity of the liquor is to that of distilled water as 815 to 1000. The muriate of lime may be conveniently obtained from the matter remaining in the distillation of water of ammonia.

The concentration of the alkohol in these processes is obviously obtained by the action of substances having a strong affinity to water,—the sub-carbonate of potash, and the muriate of lime; these attract it from the spirit, and counteract its volatility so as to prevent it from rising in the distillation. The muriate of lime exerts this agency most powerfully; and by repeated distillation from it, alkohol has been brought to its highest state of concentration, its specific gravity being so low as .800 or .798, at the temperature of 60°. Alkohol, rectified so highly as is ordered by the London and Dublin Colleges, is required for very few pharmaceutic processes; and hence, in the greater number of their officinal preparations, rectified spirit, that is, alkohol of the specific gravity of .835, is directed to be employed. This contains in 100 parts nearly 10 of water, with 90 of alkohol of the specific gravity of .815: what proportion of water the latter contains, or what constitutes real alkohol, is altogether unknown. The proof-spirit of the Edinburgh College, formed from equal parts of rectified spirit and water, is of the specific gravity of .935. That of the London and Dublin Colleges is stated at .930, and will be obtained of this strength by mixing four parts by measure of rectified spirit with three parts of water. The properties of alkohol as an agent in pharmacy, and its medicinal applications, have been already enumerated.

## CHAP. XVII.

### OLEA VOLATILIA, OLIM OLEA STILLATITIA VEL ESSENTIALIA.—VOLATILE OILS, FORMERLY DISTILLED OR ESSENTIAL OILS.

ESSENTIAL oil, as a proximate principle of vegetables, has already been considered, and its distinctive properties pointed out. As yielded by different vegetables, its chemical characters are nearly uniform; but the oils of different plants vary in their sensible qualities, particularly in those of colour, consistence, odour, and taste. Their odour is that of the plant from which they are procured; their taste also is frequently the same, particularly in those plants named aromatic, and it is always pungent and acrid; their colours are shades of yellow, green and brown; they are usually liquid, but sometimes of a thick consistence.

In a few cases, these oils, existing in distinct vesicles, can be obtained by expression. Usually they are diffused through the vegetable matter, so as to render this impracticable; they are then obtained by distillation; the heat could not be applied, however, with sufficient uniformity, and within the due degree to the vegetable matter alone: it is therefore distilled with a portion of water, not larger than what is necessary to avoid empyreuma at the end of the distillation. The oil is volatilized with the watery vapour; and though a portion remains dissolved, yet from the sparing quantity of water employed, the greater part is collected apart, either, according to its specific gravity, floating on the surface, or having subsided to the bottom. In performing the operation in the large way, the same water is repeatedly put into the still, by which the loss from the oil being dissolved is in a great measure avoided. The product of oil is very different from different plants; and the most odorous and pungent plants do not always afford the largest quantity, even where the oil is the principle in which the odour or pungency resides;—the petals of the rose, for example, or the bark of cinnamon, affording a quantity extremely small, though in the one of these the oil has the entire flavour of the flower, and the other the aromatic warmth of the bark. The quantity and quality of the oil are also influenced by the circumstances of climate, soil and season; the rich aromatic oils being generally more fragrant from the plant when growing in a warm climate and dry soil, than under the reverse of these; and the oil afforded by the aromatic vegetables of this climate is in general stronger, and in larger quantity, in a dry than in a wet season. The oil at its first distillation has frequently an odour less grateful than after it has been kept for some time; by age, however, its flavour is impaired. If the air has not been carefully excluded, it at length becomes thick; some oils deposite a little camphor, and others, when distilled anew, yield an oil similar to the original oil, a resinous substance being left.

The essential oils of commerce are sometimes adulterated, either by the addition of a cheaper oil, as that of turpentine, of an expressed oil, or of alkohol. These frauds are easily detected,—the first, by the smell, which is perceptible when the adulterated oil is dropt on paper, and heated so far as to be volatilized; the second, by the oil forming a greasy spot when it is dropt on paper, which remains so even after heat has been applied; the third, by the oil, when dropt on water, forming a milky, instead of a transparent film on the surface of the water.

Essential oils are seldom employed to answer any important indication in medicine, having scarcely any other powers than those of aromatic warmth and pungency. If used alone to relieve flatulence or nausea, they may be diffused in water by the medium of mucilage and sugar, or dissolved in alkohol, and the solution diluted with water. More generally they are employed as corrigents, to improve the taste and flavour of ungrateful medicines, to cause these to sit easier on the stomach, or to obviate nausea, or any unpleasant symptom they may be liable to produce.

The following general rules with regard to the preparation of these oils are given in the Edinburgh Pharmacopœia.

These oils are to be prepared in the same manner as the Distilled Waters, except that a smaller quantity of water is to be added. Seeds and roots are to be previously bruised or rasped. The oil is brought over with the water, and, according as it is lighter or heavier, floats on the surface, or falls to the bottom, and is afterwards separated. It is also to be observed with regard to the preparation of distilled waters and oils, that, according to the quality of the substances, their texture, the season of the year, and similar circumstances, so many differences must arise, that it is scarcely possible to give any certain and general rules which shall apply strictly to every example. Many things therefore are omitted, to be regulated according to the judgment of the operator, the most general precepts only being delivered.

The following general formula is given in the London Pharmacopœia.

Put the substance from which the oil is to be distilled into an alembic, and add as much water as cover it; then distil the oil into a large vessel kept cool.

The formula given in the Dublin Pharmacopœia is,

Let the oil be drawn by distillation from the substance previously macerated in water, having added as much water as may prevent empyreuma.

In both Pharmacopœias, it is added, that the water which is produced in the distillation of the oils of caraway, peppermint, spearmint, pennyroyal, pimento, and sweet fennel, may be preserved for use. It is always the practice in the shops to preserve the water distilled from the plant.

The following oils have a place in the Pharmacopœias.

OLEUM BACCARUM JUNIPERI COMMUNIS. Oil of Juniper. Ed. Lond. Dub.

When genuine, this oil has the flavour of the juniper berries, and is soluble in alkohol. There is generally substituted for it in the shops an oil distilled from some species of turpentine much less grateful, which alkohol does not dissolve. The genuine oil is diuretic, and it communicates this property to ardent spirit.

OLEUM JUNIPERI SABINÆ. Oil of Savin. Ed. Dub.

This plant yields more essential oil than any other does, two pounds affording not less than five ounces. The virtues of the savine seem also to depend on it, as the essential oil is said to be a powerful emmenagogue, in a dose from three to ten drops. It is however very little used.

OLEUM SPICARUM FLORENTIUM LAVANDULÆ SPICÆ. Oil of Lavender. Ed. Lond. Dub.

This oil is used principally on account of its flavour.

OLEUM RADICIS LAURI SASSAFRAS. Oil of Sassafras. Ed. Dub.

This is the heaviest of the essential oils; its odour is somewhat fragrant, and its taste warm, but it has no quality that renders it of much value.

OLEUM HERBÆ MENTHÆ PIPERITÆ FLORENTIS. Oil of Peppermint. Ed. Lond. Dub.

This is one of the most pungent of the essential oils, and at the same time it excites a peculiar sensation of coolness in the mouth. It is a common and convenient remedy to relieve flatulence and anorexia, under the form of what is named Essence of Peppermint,—a solution of one part of the oil in seven parts of alkohol; the dose of this being fifteen or twenty drops in a cupful of water.

OLEUM FRUCTUS MYRTI PIMENTÆ. Oil of Pimento. Ed. Lond. Dub.

This oil, having the flavour of the Jamaica pepper, is sometimes used on account of this flavour.

OLEUM SEMINUM PIMPINELLÆ ANISI. Oil of Anise. Ed. Lond. Dub.

This oil is of a light colour, and has rather an unpleasant smell. It congeals even at a very moderately cold temperature. It has less pungency than any of the other essential oils, and is therefore well adapted to the purpose to which it is usually applied, that of relieving flatulence and the symptoms arising from it in children, a little of it being rubbed with sugar, and mixed with the child's food. The common proportion is ten or fifteen drops of the oil to two ounces of sugar.

OLEUM SUMMITATUM FLORENTIUM RORISMARINI OFFICINALIS. Oil of Rosemary. Ed. Lond. Dub.

The odour of this oil is less grateful than when it is diluted with alkohol in the form of spirit of rosemary. It is sometimes used in ointments as a perfume, and it enters as a stimulant into the composition of the soap liniment.

OLEUM ANTHEMIDIS. Oil of Chamomile. Lond.

This oil has an unpleasant flavour, and is applied to no use.

OLEUM CARUI. Oil of Caraway. Lond. Dub.

This is one of the most grateful of the essential oils, and is well adapted to act as a carminative, or to communicate an agreeable pungency, and cover the flavour of unpleasant remedies.

OLEUM MENTHÆ VIRIDIS. Oil of Spearmint. Lond. Dub.

The flavour of this oil is similar to that of peppermint, rather less grateful, and its taste is less pungent.

OLEUM ORIGANI. Oil of Origanum. Lond. Dub.

This is occasionally used as a perfume, though less grateful than the oil of lavender.

OLEUM PULEGII. Oil of Pennyroyal. Lond. Dub.

This oil resembles the oil of peppermint and spearmint, and may be regarded as superfluous.

OLEUM FŒNICULI DULCIS. Oil of Sweet Fennel. Dub.

The flavour of this oil is similar to that of Anise, and its qualities are so unimportant that it is never used.

OLEUM RUTÆ. Oil of Rue. Dub.

The flavour of oil of rue is ungrateful, and though it has been regarded as an emmenagogue, it is altogether discarded from use.

Along with the Volatile Oils are inserted some analogous preparations in the Pharmacopœias.

OLEUM SUCCINI ET ACIDUM SUCCINI. Oil of Amber and Acid of Amber. Ed.

Take of Amber in powder, Pure Sand, equal parts. Put them mixed together into a glass retort, of which they shall fill one-half. Having adapted a large receiver, distil from a sand-bath, with a fire gradually raised. First, a watery liquor with a little yellow oil will distil over; then a yellow oil with an acid salt; afterwards, a reddish and black oil. Pour the liquor out of the receiver, and let the oil be separated from the water. Let the acid salt, collected from the neck of the retort and the sides of the receiver, be pressed between folds of bibulous paper, and freed from the adhering oil. Then purify it by solution in hot water and crystallization.

OLEUM SUCCINI PURISSIMUM Purified Oil of Amber.

Distil Oil of Amber mixed with six times its weight of Water, from a glass retort, until two-thirds of the water have passed into the receiver. Then separate this purified volatile oil from the water, and keep it in vessels well stopt.

ACIDUM SUCCINICUM. Succinic acid. Dub.

Take of Amber, Pure Sand, of each a pound. Distil with a heat gradually raised, an acid liquor, oil and salt contaminated with oil. Having removed the salt into bibulous paper, submit it to pressure to force out the oil; then sublime it.

OLEUM SUCCINI RECTIFICATUM Rectified Oil of Amber. Dub.

Take of the oil which rises in the preparation of succinic acid, a pound. Water, six pints. Distil until two-thirds of the water pass into the receiver; then separate the oil.

OLEUM SUCCINI. Oil of Amber. Lond.

Put amber into an alembic, and distil from a sand-bath with a heat gradually raised, an acid liquor oil, and salt contaminated with oil. Then distil again, and also for a third time, the oil.

Amber is a bituminous substance found in layers of bituminated wood, or in fragments or masses on the sea-shore in different countries; its origin or natural formation is not well ascertained. It is also possessed of peculiar characters; for although it approaches to the vegetable resins in a number of its properties, it differs in others, and differs remarkably in the products it affords when decomposed by heat. These products are an acid, which being procured from no other substance, derives from this bitumen the name of Succinic Acid; and a peculiar empyreumatic oil. The process is conducted according to the directions given in the Pharmacopœias. The heat requires to be raised gradually, and the interposition of the sand is useful by dividing the particles of amber, and preventing it, when it melts, from swelling up, and passing over into the receiver.

The succinic acid is in part dissolved by the water which condenses in the receiver, but the greater part is condensed in the form of a crust. When purified from the adhering oil, it is obtained in minute crystals, rhomboidal plates, of a brownish colour from a little oil still adhering to it; these are rather sparingly soluble in water, requiring 24 parts at 60° for their solution: the taste of this acid is penetrating and slightly sour; it reddens the vegetable colours, is soluble in alkohol, and is volatile and inflammable. In medicine it has been regarded as an antispasmodic and diuretic; but it appears to be wholly inactive, and is altogether discarded from practice.

The oil of amber procured by the first distillation is thick, of a dark brown colour, and a very fœtid smell; by successive distillations it is obtained of a thinner consistence and lighter colour, and it can at length be rendered nearly limpid. Its smell still remains, however, peculiar, and ungrateful: its taste is hot and acrid; it is volatile and inflammable, insoluble in water, and sparingly soluble in alkohol. In medical practice it has been celebrated as a stimulant and antispasmodic, and has been given in amenorrhœa and hysteria in a dose from 10 to 15 drops. Its internal administration is, however, entirely relinquished. Externally it is sometimes applied by friction as a stimulant in paralysis, and to relieve the pain of cramp and rheumatism, also as a stimulant and rubefacient in hooping cough; but its strong unpleasant smell renders the application extremely disagreeable.

OLEUM VOLATILE PINI PURISSIMUM, *olim Oleum Terebinthinæ purissimum.* Rectified Oil of Turpentine. Ed.

Take of Oil of Turpentine, one pound; Water, four pounds. Distil as long as any oil passes over.

OLEUM TEREBINTHINÆ RECTIFICATUM. Rectified Oil of Turpentine. Lond.

Take of Oil of Turpentine, a pint; Water, four pints. Distil the oil.

OLEUM TEREBINTHINÆ. Oil of Turpentine. Dub.

Take of common Turpentine, five pounds; Water, four pints. Distil the oil from a copper alembic. Yellow resin will remain after the distillation.

OLEUM TEREBINTHINÆ RECTIFICATUM. Rectified Oil of Turpentine. Dub.

Take of Oil of Turpentine, two pints; Water, four pints. Distil a pint and a half of the oil.

The oil of turpentine of commerce is obtained by distillation from what is named Common Turpentine; the juice of the *Pinus Larix*, or sometimes from the wood of the tree. It appears to hold dissolved a small portion of resinous matter, as when again distilled it leaves a little of a thick residuum, and the rectified oil has been said to be more volatile than previous to this distillation. The process, however, is difficult to perform, from the great volatility of the oil, and the diffusibility and inflammability of its vapour: it is one too superfluous, the common oil being sufficiently pure for any purpose to which it requires to be applied in medicine, and it is accordingly never attended to in the shops. The medicinal properties of this oil have been already considered.

OLEUM CORNU CERVINI RECTIFICATUM. Rectified Oil of Hartshorn. Dub.

Take of the Oil which rises in the distillation of the volatile liquor of Hartshorn, three pounds; Water, six pints. Distil the oil, and again distil the distilled oil frequently from water until it become limpid. It must be kept in a dark place, and in small phials quite filled with it, closely stopt.

Animal substances submitted to heat suffer decomposition, their elements entering into new combinations; one of the principal products of these decompositions is empyreumatic oil, formed from the combination chiefly of portions of the hydrogen and carbon of the animal matter. This product is obtained abundantly in the decomposition of bone or horn by heat, along with the carbonate of ammonia formed in the same process. It is at first thick, of a dark brown colour, and offensive odour: but by repeated distillations from water it is rendered thinner, more limpid, and less offensive. In this rectified state it has been celebrated as a stimulant and antispasmodic, but it is altogether discarded from modern practice.

## CHAP. XVIII.

### OLEOSA.—OILY PREPARATIONS.

THE preparations included in this chapter, under this name, are combinations of expressed oils with more active substances, principally designed for external application, the oil moderating their action, or communicating a convenient form.

OLEUM AMMONIATUM, *vulgo Linimentum Volatile*. Ammoniated Oil, commonly called Volatile Liniment. Ed. LINIMENTUM AMMONIÆ. Liniment of Ammonia. Dub.

Take of Olive Oil, two ounces; Water of Ammonia, two drachms. Mix them.

LINIMENTUM AMMONIÆ FORTIUS. Stronger Liniment of Ammonia. Lond.

Take of Liquor of Ammonia, an ounce; Olive Oil two fluidounces. Shake them together until they unite.

LINIMENTUM AMMONIÆ CARBONATIS. Liniment of Carbonate of Ammonia. Lond.

Take of Liquor of Carbonate of Ammonia, a fluidounce;

Olive Oil, three fluidounces. Shake them together until they unite.

In these compositions, the alkali combines with the expressed oil, forming a thick white saponaceous compound, in the last the combination with the alkaline carbonate is imperfect. They are all used as rubefacients, and are convenient for application; a piece of flannel moistened with any of them being applied to the part, or sometimes friction being made with the liniment for a short time. From the former mode of application, the rubefacient operation is sufficiently obtained; it is a remedy often employed in cynanche tonsillaris, as less severe than a blister. The composition of the Edinburgh College seems on the whole best adapted to general use, as of medium strength, and, if necessary, it is easy to render it a little more active.

OLEUM CAMPHORATUM. Camphorated Oil. Ed. (Linimentum Camphoræ. Lond.—Ol. Camph. Dub.)

Take of Olive Oil, two ounces; Camphor, half an ounce. Mix them, so as that the camphor may be dissolved.

This is a form under which camphor is frequently applied externally as a stimulant and anodyne in rheumatism and other similar affections, and is the most convenient one, when it is to be applied by friction. It is sometimes rendered more active by the addition of a little ammonia.

OLEUM SULPHURATUM. Sulphurated Oil. Ed.

Take of Olive Oil, eight ounces; Sublimed Sulphur, one ounce. Boil with a gentle fire, in a large iron pot, stirring constantly until they unite.

OLEUM SULPHURATUM. Sulphurated Oil. Lond.

Take of Washed Sulphur, four ounces; Olive Oil, a pint. Add the sulphur gradually to the oil heated in a large iron vessel, and stir constantly with a spatula until they unite.

This process, though apparently simple, is attended with some difficulty, the oil being very liable to boil over, or its vapour to catch fire: the heat therefore requires to be applied with caution, and a large vessel ought to be employed. It is one too unnecessary, for although the composition has been recommended in catarrh, asthma, and phthisis, it has fallen altogether into disuse. It is extremely acrid and offensive. When employed, it was given in a dose of from ten to thirty drops.

## CHAP. XIX.

### SALES ET SALINA.—OF SALTS AND SALINE SUBSTANCES.

The term Salt has long been employed, in chemical language, to denote an extensive order of substances; yet it is difficult to assign to it a precise definition, or to distinguish these by characters at once sufficiently comprehensive and appropriate. It is from a combination of the following properties, however, that the definition has been attempted to be formed.

Salts are said to be bodies eminently sapid, or which excite a strong penetrating taste when applied to the tongue. Many of them have indeed this power, but there are others, particularly among the earthy salts, in which any degree of sapidity is scarcely perceptible, while there are many bodies highly sapid which are not of a saline nature.

2d, All salts are supposed to be soluble in water, and this, strictly speaking, is perhaps true; but in many of them, the degree of solubility is so inconsiderable, that it cannot be assigned as a distinctive character of the order. Sulphate of barytes, for example, is not soluble in five thousand times its weight of water, and there are several others nearly equally insoluble.

3d, Salts are said to be capable of assuming a crystalline form. When dissolved in water, many of them, on evaporation of part of the water, concrete into regular crystals. But there are others which, either from being sparingly soluble in that fluid, or from having a strong attraction to it, cannot be easily made to crystallize; while there are substances crystallizable even from their watery solution, sugar, for example, not saline.

4th, Salts are said to be fusible by the application of heat. But the same character may be assigned to almost every other substance which heat does not decompose; and there are many salts, which, instead of being fused, are decomposed in a high temperature.

Lastly, Salts have been considered as uninflammable; and many of them must be so, as they are formed of substances already saturated with oxygen; but there are others, as ammonia and the vegetable acids, as well as the compounds of these, which are more or less inflammable; some of them even burn with a bright flame.

It is evident, therefore, that those properties which have been assigned as characteristic of the order, are not possessed by every substance which, in chemical arrangements, is regarded as saline, but that the exceptions are very numerous. Neither are they possessed exclusively by these substances; there being bodies not saline which are sapid, soluble in water, fusible by heat, uninflammable, and which have even a tendency to assume the crystalline form.

The characters of this order, therefore, are now drawn rather from the chemical composition of the substances arranged under it. It is thus understood as comprehending the acids, the alkalis, and the compounds resulting from the combination of acids with alkalis, earths, and metallic oxides. The acids and alkalis are named Simple or Primary Salts; the others Secondary, or more commonly Neutral Salts, as in general the properties of the acid, and of the alkali, earth, or metal of which they are formed, are neutralized or lost. These are the substances comprized under the present chapter, with a few associated with them for convenience, though not strictly connected with them. They are generally speaking preparations of importance; but differing widely in chemical constitution and medicinal powers, they admit of no general observations.

ACIDUM ACETOSUM DESTILLATUM. Distilled Acetous Acid. Ed.

Distil eight pounds of Acetous Acid in glass vessels with a slow fire. The two pounds that first come over are to be rejected as too watery; the four pounds which follow are the distilled acetous acid. The residuum affords a still stronger acid, but too much burnt.

ACIDUM ACETICUM. Acetic Acid. Lond.

Take of Vinegar, a gallon. Distil the acetic acid in a sand-bath, from a glass retort into a glass receiver kept cold; the first pint being rejected, keep the six pints that are next distilled.

ACETUM DISTILLATUM. Distilled Vinegar. Dub.

Take of Wine Vinegar, ten pints. Distil six pints with a gentle heat, employing glass vessels in the distillation, and rejecting the first pint which comes over. The specific gravity of this acid is to that of distilled water as 1006 to 1000.

Vinegar, Acetous Acid as it is improperly named, consists, as it is produced by fermentation, of acetic acid, largely diluted with water, and mixed with tartaric acid, extractive, mucilaginous, and saccharine matter. From the latter it is purified by distillation, at least it retains in combination only a very small portion of extractive matter. The distilled liquor is however weaker than the vinegar itself, a larger portion of the acid remaining in the residual liquor; and, in general, it receives from the distillation somewhat of an empyreumatic odour. It is usual, on the large scale, to perform the distillation in a tin still, connected with a tin spiral tube in a refrigeratory, and to add portions of boiling water during the distillation, so as to dilute the residual liquor, and bring over the whole of the acid. The process, however, ought to be conducted in glass vessels, as directed in the Pharmacopœias; as, from metallic ones, (tin, which has been employed, being often alloyed with lead), the acid may receive an impregnation that might prove noxious: the conducting the distillation so as to obtain a larger quantity of the acid than is ordered by the College may be allowed. It appears from Mr Phillips' experiments, that the process as given by the Colleges is attended with an unnecessary waste of acid: even the first eighth part ordered by the London College to be rejected has a sensible degree of acidity, a fluidounce of it decomposing from 4½ to 5 grains of carbonate of lime, and a fluidounce of the latter products not decomposing more than 8 grains. When one-fourth is rejected, as directed by the Edinburgh College, the loss is of course still greater. And this is without any adequate advantage, as distilled vinegar is not applied to any use in which it is of importance that it should be of great strength.

Distilled vinegar is colourless, not very sour to the taste; its odour usually slightly empyreumatic. It is chiefly employed as a solvent of some vegetable substances, and in making some of the salts. Sometimes it is applied externally, in preference to common vinegar, as a discutient, and as an application to burns. It has the advantage, as a pharmaceutic agent, not only of greater purity, but of not being liable, like undistilled vinegar, to spontaneous decomposition.

ACIDUM ACETOSUM FORTE. Strong Acetous Acid. Ed.

Take of Dried Sulphate of Iron, one pound; Acetate of Lead, ten ounces. Rub them together. Put them into a retort, and distil from sand with a moderate fire, as long as any acid comes over.

ACIDUM ACETICUM. Acetic Acid. Dub.

Take of Acetate of Potash, six ounces; Sulphuric Acid, three ounces. Put the acid into a tubulated retort, and add to it gradually, and in different portions, the acetate of potash, allowing the mixture to cool after every addition; then distil the acid with a moderate heat, until the residuum is dry. The specific gravity of this acid is to that of distilled water as 1070 to 1000.

These are two processes for obtaining acetic acid in a concentrated state, and others have been likewise employed. One giving a stronger acid than either of them has been long in use, and had a place in the former edition of the London Pharmacopœia. It consists in exposing verdigrease, which is a sub-acetate of copper, well dried, to a heat gradually raised, and purifying the acid which distils over by a second distillation; the high temperature in this process expelling the acetic acid from the metallic salt. In the first of the above processes, that of the Edinburgh Pharmacopœia, the expulsion of the acetic acid from the acetate of lead is favoured by the affinity exerted to the oxide of lead by the sulphuric acid of the sulphate of iron; and as these salts are dried, or contain little water of crystallization, the acid is supposed to be obtained in a concentrated state. In the process given by the Dublin College, the sulphuric acid combines with the potash of the acetate of potash, and disengages the acetic acid. This distils over; and as the acetate of potash contains little water, and the water of the sulphuric acid must be in part retained by the affinity exerted to it by the sulphate of potash, the acetic acid is obtained in a concentrated form.

Chemists had observed some difference of properties between the acetic acid obtained from the decomposition of verdigrease by heat, radical vinegar as it was named, and the acid of vinegar purified by distillation, and concentrated by freezing, or obtained in a concentrated state by the decomposition of an acetate having an alkaline or earthy base. They were therefore regarded as chemically different; the one, that obtained from the metallic salt, was believed to be more highly oxygenated, in consequence of receiving, it was supposed, oxygen from the metallic oxide, and was named Acetic Acid; while the other was named Acetous Acid. At a later period, it was supposed that they differed rather in the proportion of carbon existing in their base. But the experiments, first of Adet, and since of Darracq, have proved, that they differ merely in degree of concentration, (that expelled from the metallic salt by heat being strongest), and sometimes in a small quantity of extractive matter adhering to the acid concentrated by freezing. When freed from this, and when brought to the same specific gravity by diluting the stronger, they have the same properties, display the same affinities, and afford the same products by analysis. There is therefore only one acid, the Acetic, and the name Acetous is not properly applied.

The process of the Edinburgh College affords an acid not so highly concentrated, and therefore not so pungent as that in which it is procured by exposing verdigrease to heat: it is also liable to be empyreumatic. That procured by the process of the Dublin College is stronger; it is also more fragrant: it has the advantage of not being liable to be contaminated by any metallic impregnation; and it is free from sulphurous acid, with a portion of which the other is sometimes impregnated. A process, which would afford it equally pure, and probably stronger, would be to decompose the solid acetate of lime by sulphuric acid, as the sulphate of lime, which would be formed by its strong affinity to water, would detain it; or the acid may be brought to the highest state of concentration, by distilling it from dry muriate of lime.

Acetic acid, in its highly concentrated state, has a fragrant, and, at the same time, very sharp penetrating odour; its taste is extremely sour and pungent, and it is so acrid as to inflame the skin. It is highly volatile, evaporating at the common temperature of the atmosphere: it is also inflammable, it at least kindles when a burning body is approached to its vapour. It exerts the agencies of a powerful acid, and it has a very peculiar action on several of the proximate principles of vegetables, whence it can be applied to pharmaceutical purposes,—dissolving them, without decomposing them, or materially altering their properties. It thus dissolves resins, gum-resins, camphor, and essential oils. It is employed medicinally, principally as a stimulating perfume in languor or faintness, or to obviate the unpleasant smell of confined or corrupted air. The combination of it with camphor is principally used for this purpose, as has been noticed under the chapter of medicated vinegars; the camphor being merely dissolved in the strong acid. Henry's Aromatic Spirit of Vinegar is a preparation of a similar kind, rather more fragrant and more grateful.

ACIDUM BENZOICUM. Benzoic Acid. Ed.

Take of Benzoin, twenty-four ounces; of Carbonate of Soda, eight ounces; Water, sixteen pounds. Boil the benzoin, rubbed with the carbonate, in water for an hour, stirring them constantly, and strain. Boil the residual balsam in other six pounds of water, and strain. Mix this when strained with the former liquor, and evaporate until two pounds remain. Strain again, and drop into the liquor, as long as there is any precipitation, diluted sulphuric acid. Dissolve the precipitated benzoic acid in boiling water. Strain the liquor while hot, through linen, and put it aside, that crystals may form. These crystals being collected, and washed with cold water, dry and preserve them.

ACIDUM BENZOICUM. Benzoic Acid. Lond.

Take of Benzoin, a pound and a half; Newly Prepared Lime, four ounces; Water, a gallon and a half; Muriatic Acid, four fluidounces. Rub the benzoin with the lime; then boil for half an hour in a gallon of water, stirring constantly with a rod, and strain the liquor, when cold. Boil what remains in four pints of water, and pour off the liquor as before. Boil down these liquors mixed together to half the quantity, then strain through paper, and drop in gradually muriatic acid, till there is no farther precipitation. Lastly, having poured off the liquor, dry the powder with a gentle heat, and put it into a proper vessel placed in sand; then sublime the benzoic acid with a gentle heat.

ACIDUM BENZOICUM. Benzoic Acid. Dub.

Take of Benzoin, any quantity. Melt it in a retort, with a wide neck, to which adapt a receiver without luting it, and sublime. Let the sublimed matter be occasionally removed from the neck of the retort, that it may not condense in too large quantity. This, if it is stained with oil, press wrapt in bibulous paper, to separate the oil, and again sublime.

This last process is the one by which benzoic acid used to be obtained,—the acid being merely disengaged by heat. Scheele proposed as more economical, the process which has a place in the London Pharmacopœia, and of which that in the Edinburgh Pharmacopœia is the same with some slight modifications. In the one, that given by the Edinburgh College, the acid of the benzoin combines with the soda of the carbonate of soda, forming a soluble salt; the sulphuric acid when added combines with the soda, and the benzoic acid, being sparingly soluble in cold water, is precipitated. In the other, that given by the London College, the benzoic acid combines with the lime, and forms a soluble salt: this cannot, however, be decomposed by sulphuric acid, as the sulphate of lime, being sparingly soluble, would be mingled by precipitation with the benzoic acid; muriatic acid, therefore, is added, which combines with the lime; the muriate of lime remains dissolved, and the benzoic acid is thrown down.

The quantity of benzoic acid obtained by sublimation is greater than can be obtained by the other methods, the product, according to Mr Brande's experiments, amounting to two ounces from a pound of benzoin, while, according to the others, it is equal only to from one ounce five drachms, to one ounce six drachms and a half. But there is a difficulty in conducting the process by sublimation, from a portion of the oily matter of the benzoin being liable to rise with the acid in vapour, and communicating to it a brown tinge. By managing the heat, however, with due precaution, and changing the receiver towards the end of the sublimation, this may be avoided, at least so far as to obtain a pure product, nearly equal in quantity to that from the other methods; and as the sublimed acid is more white and brilliant than the precipitated acid, even when the latter is dissolved and crystallized, this method is still usually followed by the practical chemist, and is even more economical than the others. The London College give the precipitated acid the same brilliant appearance by sublimation.

Benzoic acid is in slender needle-like crystals, or in soft flakes, of a white colour and silky lustre; its taste is pungent and acidulous, its odour aromatic, and when it is heated, penetrating: this odour, however, appears to arise from a minute portion of oily matter adhering to it, as by dissolving the acid in alkohol, and precipitating it by water, it is obtained nearly inodorous. It is volatile and inflammable, is scarcely sensibly soluble in cold water, but is dissolved abundantly by hot water, and is also soluble in alkohol. It has been regarded as a stimulating expectorant, but is totally destitute of medicinal efficacy, and the sole consumption of it is in the composition of the paregoric elixirs of the Pharmacopœias, in which it has long been an ingredient, and is, apparently for no other reason than this, still retained.

ACIDUM CITRICUM. Citric Acid. Lond.

Take of Lemon Juice, a pint; Prepared Chalk, an ounce; or as much as may be sufficient to saturate the juice; Diluted Sulphuric Acid, nine fluidounces. Add the chalk to the lemon juice heated, and mix them; then pour off the liquor. Wash the citrate of lime which remains with water, frequently added;

then dry it. To the dried powder add the diluted sulphuric acid; boil for ten minutes; express the liquor strongly through linen, and strain through paper. Evaporate the strained liquor so far, that on cooling, crystals shall form. To obtain these crystals pure, dissolve them in water a second and third time; strain the solution each time; evaporate, and put it aside to crystallize.

The juice of the lemon consists principally of citric acid, from which, however, it is difficult to abstract the mucilaginous and extractive matter, so as to render it capable of being preserved. Hence the process of obtaining the acid in a pure crystallized form, originally proposed by Scheele, has been introduced into the London Pharmacopœia. The lime, of the carbonate of lime added to the lemon juice, combines with the citric acid, and forms citrate of lime, which, being insoluble, is precipitated; the precipitate is washed to carry off the adhering vegetable matter, and is submitted to the action of diluted sulphuric acid: the sulphuric acid combines with the lime, and disengages the citric acid; this, dissolved by the water, is pressed out from the sulphate of lime, and by the evaporation of the solution is brought to crystallize. The crystals are at first of a brownish tinge, from the re-action, it has been supposed, of the sulphuric on the citric acid. By a second or third solution and crystallization they are obtained colourless, or rather white. A slight excess of sulphuric acid, Scheele found to be useful; and its operation, as Dizé has remarked, consists in decomposing a little mucilage or extractive matter, which adheres to the citric acid, and opposes its crystallization. It remains in the residual liquor without rendering the crystals impure.

Citric acid crystallizes in rhomboidal prisms; it is easily soluble in water, has a taste extremely sour, and reddens deeply the vegetable colours. In its solid state it remains unchanged, and even in solution is not very liable to spontaneous decomposition. It is used, as has already been remarked, as a refrigerant. A grateful lemonade is prepared from it, by dissolving 30 or 40 grains in a pint of water, with the addition of a little sugar, an agreeable flavour being communicated by a little dried lemon peel having been infused in the water, or a powder formed by rubbing sugar on the fresh lemon being dissolved in it. It is used, too, in forming the common effervescing draught, being mixed with carbonate of soda, and water added. Whether it acts with equal certainty with the recent juice, as a remedy in scurvy, remains to be ascertained.

ACIDUM MURIATICUM. Muriatic Acid. Ed.

Take of Muriate of Soda, two pounds; Sulphuric Acid, sixteen ounces; Water, one pound. First expose the muriate of soda in a pot to a red heat for a short time; when cold put it into a retort. Then pour the acid, mixed with the water, and cold, on the muriate of soda. Distil from a sand-bath with a moderate fire, as long as any acid comes over. The specific gravity of the acid is to that of distilled water as 1170 to 1000.

ACIDUM MURIATICUM. Muriatic Acid. Lond.

Take of Dried Muriate of Soda, two pounds; of Sulphuric Acid; a pound and a half; of Distilled Water, a pint and a half. Mix the acid with half a pound of the water in a glass retort, and add to these when cold the muriate of soda. Pour what remains of the water into a receiver; then a retort being adapted to it, transmit into this water the muriatic acid distilled from a sand-bath, with a heat gradually increased, until the retort become red. The specific gravity of muriatic acid is to the specific gravity of distilled water as 1.170 to 1.000. If into a fluidounce of it, diluted with water, a piece of marble be thrown, half an ounce ought to be dissolved.

ACIDUM MURIATICUM. Muriatic Acid. Dub.

Take of Dried Muriate of Soda, Sulphuric Acid, Water, of each six pounds. Add the acid diluted with the water, after it has become cold, to the muriate put it into a glass retort; then distil to dryness. The specific gravity of this acid is to that of distilled water as 1170 to 1000.

The process for procuring this acid in the Pharmacopœias, is different, principally with regard to the proportions of the ingredients. It would require comparative experiments to determine which is the best proportion; it is not improbable, that in the formula of the Edinburgh College, the proportion of acid is too small, chemists having been formerly led into error in cases similar to this, by supposing, that in decomposing a compound salt by an acid, there is no advantage in adding more of the decomposing acid than is necessary to neutralize the quantity of base which the portion of salt operated on contains. We now know, that in cases of this kind, the product is increased by employing more of the decomposing agent than is strictly necessary to neutralize the ingredient with which it combines; and that if this excess be not employed, a portion of the compound operated on is not decomposed. I have accordingly observed, in performing the above process, according to the formula of the Edinburgh College, that a portion of undecomposed muriate of soda exists in the residual mass. The proportion of acid in the Dublin Pharmacopœia, is, on the other hand, probably too large; that of the London is nearer the medium; and from some experiments by Mr Phillips, the product of muriatic acid appears to be greater from it, than from a process given in a former edition, in which a smaller quantity of acid was added. The London College order, however, too large a proportion of water, and hence the acid obtained is too much diluted: its specific gravity is only 1142. The direction, that the sulphuric acid be diluted only with a portion of the water, and that the remaining water be put into the receiver, is proper, both as abridging the distillation, and assisting the condensation of the acid gas. An apparatus, on the construction of Woolfe's, is sometimes employed, but is unnecessary, as a range of two or three receivers, without tubes immersed in the liquid in each, is sufficient. The advantage of diluting the acid with at least a portion of the water, is, that the rapid effervescence and disengagement of gas produced by the action of the concentrated acid on the muriate of soda is prevented, and the process is rendered more manageable: it is much more convenient, however, to pour the acid on the salt in the retort, than to follow the reverse mode, as directed by the London College. The salt which remains in the retort is extracted by pouring water on it when cold, its solution being favoured by the excess of acid. In the large way the distillation is sometimes performed from an iron pot, connected by an earthen head and tube with a range of receivers, the fire being directly applied, and then the concentrated sulphuric acid is poured directly on the muriate of soda, undiluted, to lessen the action on the iron. But the acid prepared in this way, even when the precaution is followed, of coating the inner surface of the pot, is always contaminated with this metal. The yellow colour which the acid usually has, is not always, however, owing to the presence of iron, but is derived sometimes from a little extractive matter adhering to the sea salt, and it is to consume this that the salt is ordered, in the Edinburgh Pharmacopœia, to be exposed to a red heat, an operation which would otherwise be superfluous. The yellow colour may be removed, by distilling the acid a second time from a little muriate of soda. To the test of the strength of the acid from its specific gravity, the London College have added, that a fluidounce of it, diluted with water, ought to dissolve half an ounce of marble. This, Mr Phillips remarks, however, is the degree of power, only when the acid is of the specific gravity of 1.17; when of the strength obtained by the London process, it dissolves or rather decomposes only 204 grains of marble.

The theory of the process in which muriatic acid is obtained, is sufficiently simple. In all cases, where two acids act on one base, this base would be shared between them, in proportions determined by their affinities to it, and their relative quantities. But circumstances may prevent this participation, and cause one of the acids alone to combine with the base, as, for example, the application of a certain temperature, when one is more disposed than the other to assume the elastic form. This happens in the present case. The sulphuric acid exerts an affinity to the soda of the muriate of soda; this weakens the affinity exerted by the soda to the muriatic acid; its tendency to assume the elastic form prevails, and a portion of it is disengaged, and by the application of heat, aided by the quantity of sulphuric acid employed, the decomposition is rendered complete,—or the sulphuric acid combines with the soda, and the muriatic acid is disengaged; it is condensed partly by the water which rises with it in vapour, and partly by the water placed in the receivers.

This acid exists when uncombined in the elastic form, and is incapable of condensation by any cold or pressure hitherto applied to it. But it is rapidly and largely absorbed by water; the water, at a common temperature, and under a mean pressure, condensing 360 times its volume. When of the specific gravity of 1.170, it is supposed to contain 22 of acid, and 78 of water; it emits pungent vapours of muriatic acid gas on exposure to the air, reddens deeply the vegetable colours, tastes extremely sour, erodes immediately vegetable and animal substances, and exerts considerable chemical agencies. The acid, however, not yielding oxygen readily, can oxidate inflammable and metallic substances, only by enabling them, by a resulting affinity, to attract oxygen from the water with which it is combined.

Muriatic acid has not been analysed, those substances which decompose other acids by abstracting oxygen having no effect in producing its decomposition. Its elements therefore must be retained in union by a powerful affinity.

Some important facts have been established, however, with regard to its constitution, and particularly to its chemical relation to water. Muriatic acid gas had been supposed to be the real acid, or at least to contain only a minute proportion of water. Gay Lussac and Thenard have shewn, that it contains water in intimate combination equal to one fourth of its weight. Thus, when the acid gas is transmitted over oxide of lead, it is condensed in combination with the oxide, and a portion of water equal to this quantity is liberated. Or if oxymuriatic acid gas, the substance formed by the combination of muriatic acid and oxygen, be mingled with hydrogen gas, and exposed to light to favour their mutual action, muriatic acid gas is formed, the oxygen of the oxymuriatic acid combining with the hydrogen, and forming water, which remains in combination with the acid in the gaseous form. This water has the most important influence on the chemical relations of the acid, and, in particular, by its affinity to it favours its transition to its insulated state, and is even essential to its existence in that state. No compound, for example, of the real acid with any base, such as dry muriate of potash or of soda, can be decomposed by a dry acid, even when the most powerful heat is applied; but if a little water is introduced, the decomposition takes place with facility, and muriatic acid gas is rapidly disengaged. For the same reason, oxymuriatic acid gas is incapable of decomposition if water be excluded; charcoal, for example, aided by the most intense heat, has no effect upon it. But if water be admitted, even the weak action of solar light is sufficient to expel its oxygen, the muriatic acid receiving that portion of water necessary to its existence in its insulated form. Hence too in all cases of the action of muriatic acid on inflammable or metallic bases, the base receives oxygen from the water present, hydrogen is disengaged, and the oxide formed combines with the real acid. While in the action of oxymuriatic acid on the same bases, its oxygen combines with the base, and the oxidated product in like manner combines with the real acid, forming the same compound.

In these results, muriatic acid displays relations to water, similar to the other powerful acids. They all exert to it a powerful affinity, contain a portion of it in intimate combination, and cannot be obtained free from this combined water in an insulated state. The only peculiarities with regard to muriatic acid, are its not being capable of being decomposed by those processes which effect the decomposition of the other acids, and its combining with oxygen with facility; peculiarities probably arising from the same cause, the powerful affinity of its base to oxygen.

These facts have been explained, however, on a different hypothesis, suggested by Gay Lussac and Thenard, and since supported by Sir H. Davy, that oxymuriatic acid, instead of being a compound of muriatic acid and oxygen, is a simple substance, and that muriatic acid is a compound of it with hydrogen. According to this doctrine, the production of muriatic acid gas, in the mutual action of oxymuriatic gas and hydrogen, is a simple combination. The substances formed by the action of oxymuriatic gas, or chlorine as it has been named, on inflammable or metallic bases, are in like manner compounds of the base and the oxymuriatic principle. The production of the same compounds, by the action of muriatic acid on these bases, is conceived to arise from the decomposition of the acid, its hydrogen being disengaged, and its other element combining with the base. The water deposited when muriatic acid gas acts on metallic oxides is supposed to be formed by the decomposition of the acid, its hydrogen combining with the oxygen of the oxide, and the products, however analogous to metallic salts, are not saline substances, but are supposed to be compounds of the metals with chlorine. The production of oxymuriatic acid by the usual processes is ascribed to the oxygen imparted to the muriatic acid decomposing it, by combining with its hydrogen, forming water, and liberating the chlorine; and the disengagement of oxygen from oxymuriatic acid is supposed to arise from the decomposition of water, the hydrogen of which unites with the chlorine and forms muriatic acid. It would be foreign to the objects of this work to enter on any examination of these opinions. The common doctrine is deduced by the strictest reasoning from the facts, is least complicated, and most conformable to analogy in all its explanations: the opposite opinion rests on no conclusive evidence, and seems in a great measure to have been supported on mistaken views of what constitutes chemical induction.

Muriatic acid is applied to few medicinal purposes. It has been given as a refrigerant and antiseptic in scarlatina, in a dose of 10 or 15 drops occasionally: and to relieve *ardor urinæ* in gonorrhœa. It has also been employed, as has been already stated, as a lithontriptic; and in some cases of calculus, considerable advantage has been derived from it, both in relieving the pain, and diminishing the sediment deposited from the urine, probably in consequence of its solvent power being exerted on the phosphate of ammonia and magnesia, or the phosphate of lime, which are frequently ingredients of urinary calculi. It has been taken in a dose from 20 to 30 drops. From its chemical agency it is employed in various pharmaceutic processes. In the state of gas it has been used to neutralize contagious effluvia, but it is inferior in efficacy to nitric or oxymuriatic acid.

ACIDUM MURIATICUM DILUTUM. Diluted Muriatic Acid. Dub.

Take of Muriatic Acid, Distilled Water, each one pound. Mix them.

This is a formula rather superfluous, as muriatic acid is not employed medicinally, and requires therefore no adjustment to render its exhibition convenient; and for any pharmaceutic process, it is easy to order its dilution to the requisite extent.

AQUA OXYMURIATICA ET AQUA ALKALINA OXYMURIATICA. Oxymuriatic Water, and Alkaline Oxymuriatic Water. Dub.

Take of Muriate of Soda dried, two pounds; Manganese in powder, one pound; Water, Sulphuric Acid, each two pounds. Put the muriate of soda and the manganese mixed together into a matrass, and add the water; then by a convenient apparatus add the sulphuric acid gradually, and at intervals; transmit the gas which is disengaged through a solution of four ounces of sub-carbonate of potash, in twenty-nine ounces of water. Toward the end of the operation, apply a moderate heat to the matrass. The specific gravity of this liquid is to that of distilled water as 1087 to 1000.

The Oxymuriatic Water is prepared by transmitting the superfluous gas of the above process, by a proper apparatus, through a pint of distilled water. The specific gravity of this liquor is to that of distilled water as 1003 to 1000.

When muriate of soda, black oxide of manganese, and sulphuric acid are mingled together, the sulphuric acid combining with the soda disengages the muriatic acid; and the acid, by the action of the oxygen of the oxide of manganese, is converted into oxymuriatic acid, which assumes the elastic form: this change, according to the common doctrine, explained under the preceding process, consisting merely in the combination of the oxygen and the muriatic acid, while, according to the opposite hypothesis, it is owing to the decomposition of the muriatic acid, the hydrogen supposed to be one of its elements combining with the oxygen and forming water, while the chlorine, the other element, is liberated. The process is attended with some difficulty. If the sulphuric acid is concentrated, its action is rather too rapid, and gives rise to a disengagement of gas not easily regulated; and if any part of the elastic product is forced from the apparatus, it is extremely disagreeable to the operator, from its highly suffocating odour. It is proper therefore to use the acid diluted somewhat, and after the commencement of the operation, to favour its progress by the application of a moderate heat. The proportions of the ingredients recommended by Vauquelin, are four parts of muriate of soda, one of oxide of manganese, three of sulphuric acid, and two of water. When the combination of the gas, either with water, or with an alkaline solution, is to be effected, it is proper to use the bottles of Woolfe, so as to transmit the gas through the liquid, the first bottle being left empty to collect a little common muriatic acid that distils over, holding oxide of manganese dissolved.

Oxymuriatic acid exists in the gaseous form, and is distinguished from other elastic fluids by its colour, which is yellowish green. It has an intolerable suffocating odour. Water, at a moderate temperature, absorbs twice its volume of it, forming a liquid of a yellowish colour, having the same odour, and a harsh styptic taste. The acid both in its gaseous and liquid form is distinguished by its power of destroying the vegetable colours.

Oxymuriatic acid has been employed to neutralize the agency of contagion, and change the noxious constitution of foul or corrupted air. To Guyton we are indebted for this application of it. It has been successfully applied in fumigating the wards of hospitals, the apartments of a prison, or other situations in which the atmosphere is contaminated by noxious effluvia, and probably is in this respect the most powerful agent we have it in our power to employ. By its chemical agency, it changes the constitution of the greater number of the compound gases, and more particularly of those having carbon and hydrogen as their elements. Noxious effluvia, derived from the decomposition of vegetable and animal matter, which are the usual sources of a corrupted or contagious atmosphere, may be presumed to be of similar constitution, and therefore to be liable to similar decomposition; and accordingly it has been ascertained, that air highly tainted has its purity, so far as is connected with the removal of such effluvia, restored by the diffusion of the vapours of oxymuriatic acid. The usual materials are mingled together, the sulphuric acid being used in its concentrated state, and they are distributed in different vessels placed in the apartment designed to be fumigated. The gas is slowly disengaged and diffused, and if necessary the disengagement may be hastened by surrounding the vessel with warm sand. The only disadvantage attending the use of this gas is, that from its suffocating odour, the atmosphere in which it is diffused cannot be breathed. In some situations, as in hospitals, where the sick cannot be removed, this renders it necessary to substitute the nitrous acid vapour. But where this does not limit its use, the oxymuriatic acid, as more active, is to be preferred. In its pure state, the oxymuriatic acid is not applied to any other medicinal use, and there is therefore scarcely any necessity for the solution of it in water, which has received a place in the Dublin Pharmacopœia.

The salt obtained by transmitting the oxymuriatic acid gas through a solution of potash, and named the Oxymuriate of Potash, it has already been remarked, has been received into the Materia Medica, and has been employed as an antisyphilitic remedy. This salt is not strictly an oxymuriate, but the compound of an acid containing still more oxygen than the oxymuriatic acid, what has been named the Hyper-oxymuriatic Acid. When the oxymuriatic acid gas is introduced into the alkaline solution sufficiently concentrated, it undergoes a singular decomposition: one portion of it returns to the state of muriatic acid, and combines with part of the alkaline base; the other portion, receiving the oxygen which this had parted with, passes to the state of an acid, having of course a still larger proportion of oxygen in its composition than the oxymuriatic acid has, and this combines with another portion of the alkali. The former salt, the muriate of potash, being abundantly soluble, remains dissolved; the other, being more sparingly soluble, is deposited in crystalline plates. These form the salt named Oxymuriate, but more properly Hyper-oxymuriate of Potash, (Hyper-oxymurias Potassæ.)

These combinations are much influenced by the concentration of the alkaline solution. If it is much diluted, the oxymuriatic acid is absorbed by it, and remains united with the water and the alkali without decomposition ; as is evident from the liquor retaining the property of destroying the vegetable colours,—a property belonging to the oxymuriatic acid, but not to the hyper-oxymuriate of potash. It is only when the more powerful action of the alkali on the acid is favoured by concentration, that the decomposition takes place ; and Berthollet has supposed, even, that it is much determined by the operation of crystallization itself. The alkaline solution, therefore, into which the oxymuriatic acid gas is transmitted, ought to be of such a strength, that the hyper-oxymuriate will be formed in it, and crystallize spontaneously. The solution ordered by the Dublin College appears to be too weak, and the liquor obtained by their process probably contains much of the oxymuriatic acid undecomposed. A solution of the proper strength is obtained by dissolving sixteen ounces of subcarbonate of potash in four pounds of water ; and as the disengagement of the carbonic acid, by the action of the oxymuriatic acid, is troublesome, it is better to remove it by previous agitation of the solution with eight ounces of lime. From this solution, when the transmission of the oxymuriatic acid gas is continued for a sufficient length of time, the hyper-oxymuriate crystallizes spontaneously, and the quantity of crystallized salt ought not to be increased by any evaporation of the liquor, as a portion of muriate of potash might crystallize along with it. The crystals are therefore removed, washed with a little cold water, and dried. And when the salt is to be medicinally used, it ought always to be under this crystallized form. The solution ordered in the Dublin Pharmacopœia must be an uncertain preparation.

Hyper-oxymuriate of potash crystallizes in thin quadrangular tables, white, with considerable lustre. Its taste is cool and penetrating. It dissolves in 17 parts of cold water, and in 5 of boiling water; is fused by heat; and by a higher heat is decomposed, giving out very pure oxygen gas. From the facility with which it parts with oxygen, it acts with much force on inflammable bodies, producing, by mere trituration with them, or percussion, violent deflagrations or detonations.

Its medicinal applications have been already pointed out. When nitric acid was introduced as a remedy in syphilis, the theory which suggested its use, that it operates by communicating oxygen to the system, led to the employment of hyper-oxymuriate of potash, as a more powerful oxygenating remedy. It was given in a dose of ten grains thrice a-day; and from the cases then brought forward, appeared to be superior even to nitric acid in suspending the symptoms of syphilis. It was not however ultimately established in practice; and as no great advantage appears to be derived from it as an auxiliary to mercury, it is now seldom prescribed.

ACIDUM NITROSUM. Nitrous acid. Ed.

Take of Nitrate of Potash bruised, two pounds; Sulphuric Acid, sixteen ounces. The nitrate of potash being put into a glass retort, pour upon it the sulphuric acid, and distil from a sand-bath with a fire gradually raised, until the iron pot is at an obscure red heat. The specific gravity of this acid is to that of distilled water as 1550 to 1000.

ACIDUM NITROSUM. Nitrous Acid. Dub.

Take of Nitrate of Potash, six pounds; Sulphuric Acid, four pounds. Mix and distil to dryness. The specific gravity of this acid is to that of distilled water as 1500 to 1000.

In this process the sulphuric acid combines with the potash, and disengages the nitric acid. The latter acid, however, suffers a partial decomposition during the distillation, principally from the effect of the heat, and partly probably from the relation of the acid to water. Nitric acid retains a considerable quantity of water in intimate combination, and it cannot be obtained without this water in an insulated state. As it exists in nitre, it is partly deprived of this water, and the sulphuric acid employed to disengage it does not appear to be capable of affording that portion of water necessary to preserve the constitution of the nitric acid. When heat is applied, therefore, so as to disengage the latter acid, it is at the same time partially decomposed; it loses a part of its oxygen, and a quantity of nitric oxide gas is formed; this is absorbed by the nitric acid, which is not decomposed, and forms the nitrous acid, which is of a yellow or red colour, more or less so, according as it is more largely impregnated with nitric oxide, and according, therefore, to the degree of heat employed in the distillation. This decomposition takes place principally towards the end of the distillation, when the heat is high, and the water of the materials has been in a great measure volatilized, and the acid, therefore, is of a deeper colour, and more fuming, as the distillation has been continued longer. The residuum is sulphate of potash, with an excess of sulphuric acid, for it is found useful in practice to employ an excess of acid to render the decomposition of the nitre complete. The specific gravity of the acid is stated too high by the Edinburgh College; the coloured, or what is strictly named Nitrous Acid, being not easily procured of a greater specific gravity than 1.52. It sometimes contains minute quantities of sulphuric acid and muriatic acid; the first is detected by adding muriate of barytes to the acid diluted with two parts of distilled water, sulphate of barytes being formed; the other is detected by nitrate of silver, muriate of silver being precipitated. When not intentionally added, however, these acids are never present in sufficient quantity to render it unfit for medicinal or pharmaceutical use.

Nitrous acid is extensively employed as a pharmaceutic agent: from the facility with which it parts with oxygen, it is one of the most important, particularly in oxidating and dissolving the metals. Its powers as a tonic and antisyphilitic remedy have been already considered; though, when it is internally administered, it is necessarily given in the state of nitric acid, being brought to this state by dilution with water. In the state of vapour, it has been employed under the form of fumigation to destroy contagion; the due proportion of nitre and sulphuric acid being mingled together in small earthen cups, which are put in warm sand, and placed in the apartment designed to be fumigated, and, though inferior to oxymuriatic acid in power, it has the advantage that it can be applied without requiring the removal of the sick.

ACIDUM NITRICUM. Nitric Acid. Ed.

Take of Nitrous Acid, any quantity. Put it into a retort, and a receiver being adapted, apply a very gentle heat until the reddest part shall have passed over, and the acid which remains in the retort shall have become nitric acid.

ACIDUM NITRICUM. Nitric Acid. Lond.

Take of Nitrate of Potash dried, Sulphuric Acid, each two pounds. Mix them in a glass retort; then distil the nitric acid with the heat of a sand-bath, until red vapours are produced. Lastly, having poured the distilled acid on an ounce of dried nitrate of potash, distil it again in a similar manner. The specific gravity of nitric acid is to that of distilled water as 1500 to 1000. If a piece of marble be put into a fluidounce of it diluted with water, seven drachms ought to be dissolved.

The process given in the Edinburgh Pharmacopœia is that which has been usually followed by chemists to convert nitrous into nitric acid. The nitrous acid is merely the nitric acid holding dissolved a portion of nitric oxide: when heat is applied, the nitric oxide being more disposed than the acid to assume the elastic form, the affinity by which it is retained in combination with it is weakened, and it is disengaged: this affinity, however, so far continues to operate, that the gas carries a portion of the acid along with it, and it escapes therefore in the state of very deep coloured nitrous acid vapour. The process is thus so far attended with loss, but this may be obviated by condensing the nitrous acid vapour, by a portion of water put in the receiver, the diluted acid which will thus be obtained being easily applied to use. The heat ought to be applied by a water-bath, this being sufficiently high to expel the nitric oxide gas, and being not so high as to produce decomposition of the acid.

It is difficult, however, by this method, to render the acid perfectly colourless; the last portion of nitric oxide, communicating a pale straw colour, is retained by such an affinity, and the volatility of the acid in this state approaches so nearly to that of nitric acid, that the whole may be distilled without the oxide being entirely separated. A more perfect process to obtain perfectly colourless nitric acid, is to distil it from a little black oxide of manganese, which yields oxygen to the nitric oxide.

The process of the London Pharmacopœia is of a different kind. From the large quantity of sulphuric acid employed to decompose the nitre, the acid is obtained by the first distillation more nearly in the state of nitric. The operation of this excess of sulphuric acid, in preventing the partial decomposition which would form nitrous acid, probably depends on two circumstances: one, that from the quantity adding to the force of the affinity it exerts to the potash of the nitre, less heat is required to effect the decomposition, and the greater part of the nitric acid is brought over before it is necessary, in continuing the distillation, to raise the temperature so high as to evolve nitric oxide; the other, that the water of this excess of acid will be volatilized, in the progress of the distillation, and contribute to preserve the constitution of the nitric acid in the manner which has been explained under the preceding process. The influence of the latter circumstance is very well shewn by the fact, that the product, instead of being superior in specific gravity to nitrous acid, as concentrated nitric acid is, is inferior, being, as stated in a report made to the College on the products of this process from different proportions of the materials, 1.50, while the nitrous obtained from 6 of nitre and 3 of sulphuric acid, is stated as having been obtained at 1.53. The weight too of the former, from a given quantity of nitre, amounted to four, that of the latter only to three. The relative value of the two is expressed by the quantity of marble they dissolve, that of the nitrous being stated at twenty-one, that of the nitric twenty-nine. This expresses probably, (for they are not stated in a very distinct manner), not the relative strengths of equal weights of the two, but the relative strengths of the entire products from a given weight of nitre; for were the former the meaning, an acid of low specific gravity would be represented as stronger than one of higher specific gravity. It will thus follow, that though a larger quantity of acid is obtained from the materials, by the mode of conducting the process in the London Pharmacopœia, the acid itself is not in its concentrated state. The dryness of the nitre as ordered by the London College is altogether superfluous, and so far indeed as it has any effect counteracts the object of the process, by favouring the decomposition of the nitric acid. The second distillation is likewise unnecessary. The process is so imperfect in affording an acid which is properly nitric, that it ought to be discarded, though it may be economical in affording an acid of inferior strength.

Nitric acid is applied to the same purposes as nitrous acid. Medicinally they must be the same, as the nitrous, by the dilution necessary for its administration, is converted into the nitric. And in their chemical agencies, and therefore in their pharmaceutic applications, they are precisely alike.

ACIDUM NITROSUM DILUTUM. Diluted Nitrous Acid. Ed. Dub.

Take of Nitrous Acid, Water, equal weights. Mix them, avoiding the noxious vapours.—The same proportions are ordered by the Dublin College.

ACIDUM NITRICUM DILUTUM. Diluted Nitric Acid. Lond.

Take of Nitric Acid, a fluidounce; of Distilled Water, nine fluidounces. Mix them.

In combining nitrous acid with water, the greater part of the nitric oxide gas, if it is highly charged with it, is disengaged with effervescence; if less is present, it is retained and converted into nitric acid by the oxygen held loosely dissolved by the water. This, therefore, is diluted nitric acid. It is employed in a number of the chemical processes of the Pharmacopœia, and is convenient, in particular, for the solution of metals, being of that strength at which its action upon them is not too rapid. The diluted nitric acid of the London Pharmacopœia is too weak for this; it can only be intended for internal administration, and as for this purpose it will require still farther dilution, the proportion might be left to be regulated by extemporaneous prescription. The deviation from the proportions in the other Pharmacopœias is therefore without any adequate reason or advantage, and may sometimes lead to dangerous consequences in medical prescriptions.

ACIDUM SULPHURICUM DILUTUM. Diluted Sulphuric Acid. Ed.

Take of Sulphuric Acid, one part; Water, seven parts. Mix them.

ACIDUM SULPHURICUM DILUTUM. Diluted Sulphuric Acid. Dub.

Take of Sulphuric Acid, two ounces; Distilled Water, fourteen ounces. Having mixed them gradually, put aside that they may cool; then pour off the clear liquor. The specific gravity of this acid is to that of distilled water as 1090 to 1000.

ACIDUM SULPHURICUM DILUTUM. Diluted Sulphuric Acid. Lond.

Take of Sulphuric Acid, a fluidounce and a-half; of distilled water, fourteen fluidounces and a-half. Gradually add the Acid to the Water; then mix them.

The intention of this formula is to afford an acid sufficiently dilute to admit of its dose being easily regulated. The London College have, without any necessity, altered the proportions both from those of the other Pharmacopœias, and from those which had formerly been ordered in their own Pharmacopœia: they order a fluidounce and a half of sulphuric acid to be mixed with fourteen fluidounces and a half of distilled water, giving the proportion by weight of one part of acid, to nearly five and a half of water. The reason given for this change is, that "the mixture will be more conveniently made, and its dose more easily apportioned, than that of the former Pharmacopœia." The absurdity of this is obvious. A mixture of sulphuric acid with water is made just as easily in one proportion as in another, and the dose of the diluted acid, whatever may be its strength, is apportioned with equal facility. Nor is it of any importance to have any relation between the dose of the diluted acid and any particular quantity of the concentrated acid, as the acid in the latter state has never been prescribed internally. It is to be regretted, that the strength of a preparation, which for a considerable period has been employed in medical practice, has been thus unnecessarily changed, and changed to such an extent.

The preparation of Sulphuric Acid being carried on on a large scale, for the purposes of commerce, no process is given for it in any of the Pharmacopœias, nor could it be executed in the shops. It is formed by burning sulphur mixed with from one-eighth to one-tenth of nitrate of potash, in large leaden chambers. By the oxygen afforded by the nitre, the sulphur is enabled to burn slowly, though the chamber be closed so as to admit of a very imperfect circulation of air; and the acid formed is principally the sulphuric, while, from the combustion of sulphur in atmospheric air alone, sulphurous acid chiefly is produced. The cause of this appears principally to be, that from the decomposition of the nitric acid of the nitre, nitric oxide gas is evolved, which combines with the oxygen of the atmospheric air, and forms nitrous acid vapour, which, in its turn, yields oxygen to the sulphurous acid formed by the direct combustion of the sulphur. The diffusion of watery vapour too through the chamber probably facilitates the formation of sulphuric acid. The acid vapours are absorbed by water placed in the bottom of the chamber. This liquor, when sufficiently acidulated, is concentrated by evaporation, and afterwards by boiling it in glass retorts, and an acid is obtained thick and oily in its appearance, colourless and transparent, having a specific gravity of 1850. Formerly this acid was procured from the decomposition of sulphate of iron, the green vitriol of commerce, by heat; and hence the origin of the name, Vitriolic Acid, by which it has been known.

Sulphuric acid prepared in this manner is never perfectly pure. It contains a quantity of sulphate of potash, (the acid combining with a portion of the potash of the nitre,) and sometimes a small portion of sulphate of lead, derived from the action of the acid on the lead of the chamber. From these it is in a great measure purified by dilution with water, the diluted acid being incapable of holding them dissolved, and hence one advantage of the dilution. The dose of the diluted is also more manageable than that of the concentrated acid. As an astringent it is taken to the extent of from fifteen to thirty drops, usually in a cupful of water.

ACIDUM SULPHURICUM AROMATICUM. Aromatic Sulphuric Acid. Ed.

Take of Alkohol, two pounds; Sulphuric Acid, six ounces. Drop the acid gradually into the alkohol. Digest the mixture with a very gentle heat in a close vessel for three days, then add of Bark of Cinnamon bruised, one ounce and a half; of Ginger bruised, one ounce. Digest again in a close vessel for six days; then strain through paper placed in a glass funnel.

The dilution of the acid by the alkohol in the proportions in which they are mixed in this preparation, is such, that little chemical action appears to be exerted during the digestion; an odour somewhat peculiar is acquired, but the acidity is little impaired. The aromatics render it more pleasant, and the preparation may be considered therefore as a grateful one for the exhibition of sulphuric acid. Its dose is thirty drops, given in a cupful of water. It is not unfrequently used in dyspepsia, hæmoptysis, and other diseases in which this acid is employed.

ÆTHER SULPHURICUS. Sulphuric Ether. Ed.

Take of Sulphuric Acid, Alkohol, of each thirty-two ounces. Pour the alkohol into a glass retort, capable of bearing a sudden heat. Then pour on the acid in an uninterrupted stream. Mix them gradually by frequent and gentle agitation; then immediately distil from a sand-bath, previously heated for this purpose, into a receiver kept cool with water or snow. Let the heat be regulated in such a manner that the liquor may be made to boil as soon as possible, and continue to boil until sixteen ounces have distilled over; then remove the retort from the sand. To the distilled liquor add two drachms of potash; then distil again from a high-necked retort, with a very gentle heat, into a receiver kept cool, until ten ounces have passed over. If to the acid remaining in the retort after the first distillation, sixteen ounces of alkohol be added, and the distillation be repeated, ether will again be produced. And this may be often repeated.

ÆTHER SULPHURICUS. Sulphuric Ether. Lond.

Take of Rectified Spirit, Sulphuric Acid, of each a pound and a half. Pour the spirit into a glass retort, and add to it gradually the acid, shaking frequently, and taking care that the heat do not rise higher than 120°, until they are mixed together. Then place the retort cautiously in sand previously heated to 200°, so that the liquor may boil as quickly as possible, and let the ether pass into a tubulated receiver, to which another is adapted kept cool by ice or water. Distil the liquor until a heavier portion begin to pass over, which will be observed beneath the ether at the bottom of the receiver. To the liquor which remains in the retort, add again twelve ounces of Rectified Spirit, so that ether may distil in a similar manner.

ETHER RECTIFICATUS. Rectified Ether. Lond.

Take of Sulphuric Ether, fourteen fluidounces; Fused Potash, half an ounce; Distilled Water, two fluidounces. Dissolve first the potash in the water, add to it the ether, shaking thoroughly, until they are mixed; lastly, distil twelve ounces of rectified ether with a heat of about 120°, from a large retort into a vessel kept cold.

LIQUOR ÆTHEREUS SULPHURICUS. Sulphuric Ethereal Liquor. Dub.

Take of Rectified Vinous Spirit, Sulphuric Acid, of each thirty-two ounces. Pour the spirit heated to 120° into a retort capable of bearing a sudden heat, and pour upon it the acid in a continued stream. Mix them gradually, and distil with a heat sufficiently strong and quickly raised, twenty ounces by measure of liquor into a receiver kept cool. If to the acid remaining in the retort, sixteen ounces of rectified spirit are added, sulphuric ethereal liquor will again be obtained by distillation.

ÆTHER SULPHURICUS. Sulphuric Ether. Dub.

Take of Sulphuric Ethereal Liquor, twenty ounces; Subcarbonate of Potash, dry and in powder, two drachms. Mix them, and distil twelve ounces by measure from a high-necked retort with a very gentle heat into a receiver kept cold. The specific gravity of this liquid is to that of distilled water as 765 to 1000.

The directions in the Pharmacopœias, for conducting this process, are nearly the same. The principal peculiarity in the formula of the London Pharmacopœia, is that of adding the acid gradually to the spirit, agitating the mixture after each addition; but on account of the rise of temperature as the mixture proceeds, this is more difficult than the mode directed by the Edinburgh College, of mixing the whole acid and alkohol at once, and any loss of ethereal vapour from the sudden action produced by the mixture in the latter mode is very trivial. The direction given by the Dublin College, to heat the spirit to 120°, before adding the acid, must render the making the mixture more difficult, and endanger the breaking of the retort from pouring in the dense cold acid.

On mixing equal weights of sulphuric acid and alkohol, a mutual action, marked by an elevation of temperature, and change of colour is produced, and a vapour is disengaged, of a pleasant ethereal smell. On raising the temperature by the application of heat, so as to cause the mixed liquid to boil, ether is formed, and distils over. This continues for a considerable time: towards the end of this stage of the process, the liquid in the retort becomes capable of sustaining a higher temperature, and along with the ether, there is produced a white vapour, which condenses in streaks having an oily appearance, in the neck of the retort, and this increasing, collects in the form of a dense oily-like fluid, named Oil of Wine, or Ethereal Oil, which falls to the bottom of the receiver. A quantity of olefiant gas is at the same time formed, and such a quantity of carbonaceous matter is separated from the alkohol that the liquor becomes of a deep brown colour. If the heat be continued beyond this, there is a sudden and copious production of sulphurous acid gas, which, not escaping easily from the heavy liquor in the retort, causes it to swell up, and if not removed from the fire, it will pass over into the receiver. The principal difficulty, therefore, in conducting the process, is to continue the distillation, so as to obtain the largest produce of ether, without bringing over the liquor from the retort. The rule given in the Edinburgh

Pharmacopœia is to continue it, until the liquid condensed in the receiver is equal to half the quantity of alkohol that had been employed; as when this has been obtained, the formation of ether will have nearly ceased; this however is not very easily ascertained with accuracy: The London College direct the distillation to be continued until the ethereal oil is produced; and if care be taken to guard against the sudden swelling up of the liquor in the retort, this may be done, and rather a larger product obtained. The production of this oil is not however always uniform. The most simple rule is, that whenever the neck of the retort becomes obscured with white vapours, the fire should be withdrawn; and if the materials begin to swell, the retort ought to be raised in the sand. The receiver requires to be kept cool by immersion in water, or causing water to trickle over it, in order to promote the condensation of the ether; and care ought to be taken to avoid approaching a burning body to the apparatus, as accidents have sometimes happened, when the vessels were not closely luted, from the volatility and inflammability of the ethereal vapour.

There is considerable difficulty in establishing the theory of the formation of ether. As the process proceeds, the liquor in the retort assumes a dark colour, and a quantity of carbonaceous matter, somewhat bituminous, is diffused through it; it is likewise found to be considerably diluted with water, and another portion of water distils over with the ether. These changes accompany the formation of the ether, and both must be referred to changes in the composition of the alkohol. The explanation usually given of them proceeded on the assumption, that the acid acts by yielding oxygen, which, combining with the hydrogen of the alkohol, forms water; the balance of affinities being thus broken, part of the carbonaceous matter of the alkohol is likewise separated, and its remaining hydrogen and carbon, with any portion of oxygen it may contain, entering into combination, form the ether. To this theory, however, it was objected by Fourcroy and Vauquelin, that the decomposition of the sulphuric acid is not essential to the formation of ether: it may take place to a certain extent towards the end of the process, when the temperature is high, and the liquor is loaded with carbonaceous matter; but there are no indications of it, they affirm, in the earlier stage, during which principally ether is formed; there is no evolution of sulphurous acid, and if the process be stopt at this stage, it was affirmed by these chemists, that the whole acid is to be found undecomposed, the residual liquid being capable of saturating as much of an alkaline base, as the quantity of sulphuric acid employed would do. This led, therefore, to a different view of the agency of the acid. Instead of communicating oxygen, they supposed it to operate by a disposing, or what may be named a resulting affinity, causing part of the oxygen and hydrogen of the alkohol to combine and form water; then the equilibrium of affinities being subverted, carbonaceous matter is precipitated from the alkohol, and new affinities being exerted, ether is the product of the combination of its remaining elements. The subject, however, notwithstanding the researches of these chemists, is obscure. The fact, with regard to the acid not being decomposed, is not altogether certain; for the non-appearance of sulphurous acid, from which it has been inferred, may be owing to the small quantity evolved being retained in the residual liquid, or combined with some of the products; and the power of the liquor to saturate as much of an alkaline base, as the sulphuric acid used in the process could do, may, should even a portion of the acid be decomposed, be owing to the formation, by oxygenation of the elements of the alkohol, of acetic or oxalic acid, both of which indeed have been said to exist in the residual liquor. The fact, that those acids form ethers most readily from alkohol, which yield oxygen most readily, favours the supposition, that a communication of oxygen from the acid is necessary to the commencement at least of the series of changes.

It is sufficiently proved, however, that the decomposition of the acid is not necessary to any great extent, for the residual liquor is still capable of converting a fresh portion of alkohol into ether; and as this is economical, it is ordered in the Pharmacopœias. And its power of doing so appears to diminish progressively, not so much from exhaustion of the acid, as from its becoming too much diluted with water. This water may have either entirely pre-existed in the alkohol; or only partially, and have been in part formed by combination of portions of oxygen and hydrogen; and we have no certain mode of determining which of these is the case. The carbonaceous matter which is precipitated, is obviously derived from the alkohol; and its separation led to the conclusion, that less of this matter must exist in the composition of ether than in that of alkohol; that hydrogen, therefore, predominates in the composition of the former, and to this its greater volatility and levity were ascribed. Both alkohol and ether in burning afford water and carbonic acid, and from the comparative quantities afforded in the combustion of each, Cruickshank inferred that the proportion of carbon to hydrogen is in ether as 5 to 1 nearly, while in alkohol it is as 8 or 9 to 1. The younger Saussure, on the contrary, has inferred, from the products of their detonation with oxygen, that ether contains more carbon and hydrogen than alkohol, and differs from it in having a smaller proportion of oxygen. The expenditure of hydrogen and oxygen, therefore, in the formation of water, during the production of ether, must, according to this result, exceed the proportion of carbonaceous matter which is precipitated. The proportions he assigns are 59 carbon, 22 hydrogen, and 19 oxygen. He found, that in its combustion, when it has been properly rectified, it yields no trace of sulphuric acid,—a proof that neither the acid nor the base of the acid enters into its composition, a circumstance in which it differs from the ethers formed from some of the other acids.

Ether obtained by the first distillation is not pure. It is diluted with a considerable proportion of water, sometimes also it contains alkohol, and very generally a portion of sulphurous acid, which had been evolved towards the end of the distillation. To free it from these is the object of the directions for its rectification, which are nearly the same as given in the different Pharmacopœias, the first product being distilled from potash, in a high-necked retort, with a very gentle heat, the potash detaining the sulphurous acid by the affinity it exerts to it, and rendering the water also less volatile. A portion of water is ordered to be added to the potash and ether in the London Pharmacopœia, which may be useful by attracting the alkohol more effectually: it causes, however, some waste of ether. And as all the Colleges admit of a second distillation from the residual liquor, and a fresh portion of alkohol, directions ought to be given with regard to the rectification of the product of this, for it is considerably weaker than the product of the first distillation. The two products ought to be mingled together, and then rectified. If the unrectified ether be much impregnated with sulphurous acid, from the distillation having been continued longer than usual, it will be useful in the process of rectification to add a little black oxide of manganese, which yielding oxygen to the sulphurous acid, converts it into sulphuric, and abstracts it more effectually than is done by the alkali alone. After the acid has been abstracted, the ether may still have an intermixture of alkohol which has distilled over unchanged. This can only be abstracted by agitation with water, which dissolves it. This ought to be done, therefore, previous to the distillation from the potash; the unrectified ether being agitated with an equal quantity of water, the liquid which floats above the water, when the agitation has ceased, being drawn off, the due proportion of potash being added to it, and the distillation being performed as directed in the Pharmacopœias. The ether is thus obtained in its purest form. In the London and Dublin Pharmacopœias, both the Unrectified and Rectified Ether have a place. The Edinburgh College, with more propriety, admit of no distinction, but name the product when rectified, Sulphuric Ether, and sanction its use only in this state.

Sulphuric Ether in a state of purity has a peculiar odour, strong and diffusive, but not pungent; its taste is warm and penetrating; it is colourless and transparent; its specific gravity is 0.732, and when highly rectified is brought so low as .716; it is therefore one of the lightest known liquids. It is also one of the most volatile; it evaporates rapidly at common temperatures; it boils strongly in vacuo, even below 32, and under the atmospheric pressure at 98°. In evaporating it absorbs much caloric; hence, if dropt on the hand it quickly disappears, producing on the spot a sensation of cold; and this affords a very good test of its purity, the volatility being greater, as it is more highly rectified. It is soluble in alkohol in every proportion; in water it dissolves only in the limited proportion of one part to ten; and this affords another test of its proper preparation, as if more soluble it is diluted either with water or alkohol.

Its medicinal properties have been already considered. It is employed principally as an antispasmodic in asthma, hysteria, singultus, and other morbid affections connected with spasm, being given in a dose from half a drachm to a drachm. And it is sometimes applied externally as a stimulant, or, from the cold attending its evaporation, as a remedy to burns.

ÆTHER SULPHURICUS cum ALKOHOLE. Sulphuric Ether with Alkohol. Ed.

Take of Sulphuric Ether, one part; Alkohol, two parts. Mix them together.

SPIRITUS ÆTHERIS SULPHURICI. Spirit of Sulphuric Ether. Lond.

Take of Sulphuric Ether, half a pint; Rectified Spirit, a pint. Mix them.

A process had formerly a place in the Pharmacopœias, in which sulphuric acid and alkohol were submitted to distillation, more alkohol being employed than the acid could convert into ether. A portion of it, therefore, distilled over unchanged on the first application of the heat, and served to dilute the ether that followed. For this preparation, which had been received into practice under the name of Sweet Spirit of Vitriol, the present has been substituted, but it has no peculiar advantage, and is seldom prescribed.

ÆTHER SULPHURICUS cum ALKOHOLE AROMATICUS. Aromatic Sulphuric Ether with Alkohol. Ed.

This is made from the same aromatics, and in the same manner as the Compound Tincture of Cinnamon, unless that in place of Diluted Alkohol, Sulphuric Ether with alkohol is employed.

SPIRITUS ÆTHERIS AROMATICUS. Aromatic Spirit of Ether. Lond.

Take of Cinnamon Bark bruised, three drachms; Cardamom Seeds in powder, a drachm and a half; Long Pepper in powder, Ginger Root cut, of each a drachm; Spirit of Sulphuric Ether, a pint. Macerate for fourteen days in a glass vessel closed, and strain.

The addition of these aromatics to the sulphuric ether in this formula is of so little importance, that the preparation is scarcely ever used, and from the quantity of ether imbibed by the materials is a very uneconomical one.

OLEUM ÆTHEREUM. Æthereal Oil. Lond.

The liquor remaining after the distillation of sulphuric ether, distil with a very gentle heat, until a black froth swells up; then immediately remove the retort from the fire. To the liquor which remains in the retort, add water, so that the oily part may float upon it. Draw this off, and mix with it lime water, as much as may be sufficient to neutralize the acid which is contained in it, agitating them together. Lastly, withdraw the ethereal oil after it has separated.

LIQUOR ÆTHEREUS OLEOSUS. Oily Ethereal Liquor. Dub.

Take the liquor remaining in the retort after the distillation of sulphuric ether. Distil it with a moderate heat to one half.

The product obtained by these processes is probably the same; it is the substance long known by the name of Oil of Wine: in the first process it is formed, but not distilled over; in the second, it is obtained insulated by distillation, though to conduct this is attended with considerable difficulty, from the re-action of the carbonaceous matter, which has been separated from the alkohol, on the sulphuric acid. The London process, according to Mr Phillips, does not succeed. The nature of this oily substance has not been well determined. It has been considered as a compound of ether and sulphurous acid: it is not proved that by the combination of these it can be formed, but by agitation with potash they are obtained from it, which so far proves that sulphurous acid enters into its composition. Fourcroy and Vauquelin supposed, that it is analogous to ether, differing from it in containing a larger proportion of carbon. It can be formed more directly by distilling ether from sulphuric acid. It is thick, unctuous in appearance, less volatile than ether, and soluble both in it and in alkohol. It is applied directly to no medicinal use, but is employed in forming the following preparation:

SPIRITUS ÆTHERIS COMPOSITUS. Compound Spirit of Ether. Lond.

Take of Spirit of Sulphuric Ether, a pint; Ethereal Oil, two fluidrachms. Mix them.

A composition had been in use under the name of Hoffman's Anodyne Liquor, which consisted of alkohol, with a portion of ether and ethereal oil. This, after having been discarded from the Pharmacopœias, has been restored in the present preparation, on the supposition that it possesses superior powers as an anodyne. It probably differs, however, in nothing from ether with alkohol, at least there is no distinct proof of any peculiarity of operation being communicated by the ethereal oil.

ÆTHER NITROSUS. Nitrous Ether. Dub.

Take of Nitrate of Potash, dried and in coarse powder, one pound and a half; Sulphuric Acid, one pound; Rectified Vinous Spirit, nineteen ounces by measure. Put the nitrate of potash into a tubulated retort, placed in a bath of cold water;

and add to it gradually, and in small quantities, the sulphuric acid and alkohol, previously mixed and allowed to become cold. Without any external heat, or with only such a slight degree of it as may be communicated by the addition of a little tepid water to the bath, an ethereal liquor will begin to distil. In a short time, the heat in the retort will increase spontaneously, and a considerable ebullition will take place, which must be moderated by adding a portion of cold water to the bath. It is necessary also, that the receiver should be kept cold with water or snow, and it ought to be furnished with an apparatus adapted to transmit through a pound of rectified spirit, in a phial kept cold, the highly elastic vapour, disengaged suddenly, and with great force, from the mixture, if the heat is raised rather too high. The ethereal liquor thus obtained by spontaneous distillation is to be put into a phial closely stopt with a glass stopper; and to neutralize the excess of acid, as much sub-carbonate of potash, dry and in powder, is to be added as is necessary, closing the phial after each addition, and determining the neutralization by the test of litmus. This is generally attained on the addition of about a drachm of the salt, and in a short time the nitrous ether rises to the surface, and may be withdrawn by a funnel. To obtain the ether in its purest state, distil it again from a water-bath, heated to about 140° to one half. Its specific gravity is to that of distilled water as 900 to 1000.

The process for preparing nitrous ether has always been found difficult, from the great susceptibility of decomposition of the acid, and the rapidity with which it communicates oxygen to the alkohol. Their mutual action, in consequence of this, becomes extremely violent, and it is difficult to add the requisite proportion of nitric acid to convert it into ether, or to do so at least without considerable waste in the dissipation of elastic products. Different arrangements have been contrived to facilitate this, but probably none that can be conducted more easily than that now received into the Dublin Pharmacopœia, originally contrived by Woulfe, and found by Pelletier to succeed better than any other. The addition of the mixture of sulphuric acid and alkohol should be made in small quantities at a time, not exceeding two ounces, and the quantity of product is increased by keeping the first receiver perfectly cool, and connecting with it not merely one bottle, but a range of bottles, containing, according to a method employed by Thenard, a saturated solution of muriate of soda kept cool by ice, through which the elastic product is transmitted; it is condensed, and the liquid floats on the surface.

The theory of the formation of nitric ether remains obscure; the series of changes, however, are obviously altogether different from those which take place in the production of sulphuric ether. The acid is entirely decomposed, or nearly so, scarcely any trace of it having been found by Pelletier in either the distilled or the residual liquor; there is no precipitation of carbonaceous matter from the alkohol, the liquor remaining transparent, and of a light yellow colour; and it contains oxalic and acetic acids, much diluted with water. Thenard, in his researches on this subject, found, that the elastic fluid disengaged during the process, consists of nitrogen, nitric and nitrous oxide, and carbonic acid gases, holding dissolved ether, and a portion of acid partly nitrous, partly acetic. The nitric ether, which is condensed, has also combined with it nitric and acetic acids; and when these are abstracted, so that it has no sensible acidity, it acquires this merely on keeping, a proof that the elements of these acids exist in its composition. From the products obtained from its decomposition by transmitting it through an ignited tube, he infers, that 100 parts of it consist of 14.49 of nitrogen, 28.65 of carbon, 48.52 of oxygen, and 8.54 of hydrogen. In its formation, much of the oxygen of the acid appears to combine with the hydrogen of the alkohol, forming water; a portion of it unites with part of the carbon, forming carbonic acid, and with portions both of carbon and hydrogen producing acetic acid; a considerable part of the nitrogen of the acid is disengaged in its insulated state, or in the form of nitric and nitrous oxides, and the remaining oxygen and nitrogen combine with the remaining carbon and hydrogen, and form the nitric ether.

Nitric ether is light and highly volatile; its colour is usually yellow, probably, however, from the presence of a portion of free nitric acid surcharged with nitric oxide; its odour is strong and penetrating, though not so fragrant as that of sulphuric ether; when pure and concentrated its volatility is such, that it instantly evaporates when poured from a phial, and boils at 70° under the common atmospheric pressure; it is highly inflammable: with alkohol it combines in every proportion, but in water it is soluble only in limited quantity, requiring, according to Thenard, when pure, 50 parts for its solution.

This ether has scarcely in its pure form been applied to any medicinal use; though it not improbably is possessed of powers analogous to those of sulphuric ether.

SPIRITUS ÆTHERIS NITROSI. Spirit of Nitrous Ether. Ed.

Take of Alkohol, three pounds; Nitrous Acid, one pound. Pour the alkohol into a large phial placed in a vessel full of cold water, and add the acid gradually, agitating them frequently. Close the phial lightly, and set it aside for seven days in a cool place; then distil the liquor with the heat of boiling water into a receiver kept cold with water or snow, as long as any spirit comes over.

SPIRITUS ÆTHERIS NITRICI. Spirit of Nitric Ether. Lond.

Take of Rectified Spirit, two pints; Nitric Acid, three ounces. Add the acid gradually to the spirit, and mix them, taking care that the temperature shall not rise higher than 120°; then with a gentle heat distil twenty-six fluidounces.

Spiritus ætthereus nitrosus. Nitrous Ethereal Spirit. Dub.

Add to what remains after the distillation of nitrous ether the Rectified Spirit of Wine which had been employed in the process to condense the elastic vapour, and distil with the highest heat of a water-bath to dryness. Mix this distilled liquid with the alkaline solution remaining after the separation of the nitrous ether, and add also as much dry sub-carbonate of potash as shall be sufficient to neutralize the free acid, ascertaining this by the test of litmus. Lastly, distil this with the mean heat of a water-bath while any liquid comes over. The specific gravity of the distilled spirit is to that of distilled water as 880 to 1000.

A preparation similar to that of the Edinburgh Pharmacopœia has long been employed in medicine. It consists probably of nitric ether diluted with alkohol, and contains always a portion of free acid. It is not difficult to add the nitric acid to the alkohol in the proportion of one to three parts, at least from this quantity of acid added with precaution, no violent action results. If heat were applied to this mixture, however, so as to raise it to 212°, a mutual decomposition, attended with the rapid extrication of elastic products, would take place. The heat must therefore be either applied very slowly, or the method ordered by the Edinburgh College must be followed, that of allowing the mixture to stand for some days in a cool place. During this time, a mutual action is exerted between the acid and alkohol; the former is partially decomposed, and the heat required for distillation can be safely applied. That this decomposition takes place is proved by the experiments of Bayen. He digested an ounce of nitrous acid with two ounces of alkohol for five weeks; the liquor then required for its saturation only 134 grains of an alkaline base, while an ounce of the same acid required to saturate it 282 grains of the same base. And when, after digesting the acid and alkohol together, he submitted them to distillation, on mingling the product and the residual liquor, the whole was capable of neutralizing only 32 grains. By this reciprocal action of the acid and alkohol, a portion of nitric ether has been supposed to be formed, which distils over with a considerable portion of unchanged alkohol, and a quantity of free acid. This, however, is not altogether certain. The acid is so much diluted by the large proportion of alkohol, that it does not act on it with the same force; and the product is different in its qualities from nitric ether, being in particular more fragrant. Still it appears, that the series of changes are somewhat similar, the nitric acid being in part decomposed, and oxalic and acetic acids formed. The propriety of the change which has been made by the London College, that of diminishing so much the proportion of nitric acid, though it renders the process more economical, may be questioned, both as less nitric ether must be formed when the proportion of acid is so small, and as a considerable share of the medicinal efficacy of the preparation depends on the free acid.

The formula of the Dublin College must give a preparation considerably different from the others, particularly in containing no free acid. The residual liquor which is ordered to be employed, must contain a portion of nitric acid; and the alkohol which has been employed to condense the elastic fluid of the first distillation, and which is submitted to the action of this residual liquor, probably contains a portion of nitric ether: by the farther action exerted between them, a product will probably be formed somewhat analogous to that obtained by the preceding processes. But by the action of the alkali, to which it is afterwards submitted, its acidity must be removed, and to a certain extent this must modify its medicinal powers. The product of the process which has been longest in use, that of the Edinburgh Pharmacopœia, and the powers of which are sufficiently ascertained, is probably that which ought to be preferred.

Spirit of nitric ether has an odour extremely fragrant; its taste is pungent and acidulous; it is volatile and inflammable, soluble readily both in alkohol and in water. It is employed principally as a grateful refrigerant in inflammatory affections, as a diuretic in dropsy, or rather as an auxiliary to promote the operation of more powerful diuretics, and as a stimulant relieving nausea and flatulence. Its dose is 30 or 40 drops taken in a cupful of water.

CARBONAS POTASSÆ. Carbonate of Potash. Ed.

Let impure Carbonate of Potash be put into a crucible, and exposed to a red heat, that the oily impurities, if any are present, may be burnt out; then having rubbed it with an equal weight of water, mix them thoroughly by agitation. The liquor, after the impurities have subsided, being poured into a clean iron-pot, is to be boiled to dryness, stirring the salt constantly towards the end of the boiling, that it may not adhere to the vessel.

POTASSÆ SUBCARBONAS. Subcarbonate of Potash. Lond.

Take of impure Potash, three pounds; of boiling Water, three pints and a-half. Dissolve the Potash in the Water, and strain; then pour it into a clean iron vessel, and dissipate the water by a gentle heat, so that the liquor may become thick; afterwards having withdrawn the fire, stir it constantly with an iron spatula until the salt pass into small grains. A purer subcarbonate of potash may be prepared in the same manner from tartar, which has been first-burnt, until it be of a grey colour.

Subcarbonas kali. Subcarbonate of Kali. Dub.

Take of Potashes in coarse powder, Cold Water, of each six pounds. Mix by rubbing them together, and macerate for a week in an open vessel, stirring occasionally; then strain the ley, and evaporate to dryness, in a very clean iron vessel, stirring the saline mass constantly towards the end of the evaporation, with an iron spatula. When reduced in this manner to a coarse powder, let it be kept in close vessels. Before dissolving the Potashes in water, if they are very impure, let them be calcined in a crucible until they become white.

The Potash and Pearl-ash of commerce are obtained by the incineration of the wood of land vegetables; the ashes being lixiviated with water, so as to dissolve the saline matter, and this being evaporated to dryness. The dry mass consists principally of sub-carbonate of potash, with smaller quantities of sulphate and muriate of potash, siliceous earth, and metallic matter, principally oxides of manganese and iron. These are in a great measure abstracted by the above process, the sub-carbonate of potash from its greater solubility being dissolved, while the others, and especially the earthy and metallic matter, from the small quantity of water employed, remain undissolved. It is obtained at least sufficiently pure for medicinal or pharmaceutical use.

This saline matter is in the state of sub-carbonate, and is therefore improperly named carbonate in the Edinburgh Pharmacopœia. It is deliquescent, acrid, changes the vegetable colours to a green, and has the general alkaline properties. It consists, according to Kirwan, of about 60 of potash, 30 of carbonic acid, and 6 of water, with a few grains in 100 of sulphate of potash, siliceous and argillaceous earth. It is seldom applied to any medicinal use, but is employed principally as an agent in Pharmacy.

CARBONAS POTASSÆ PURISSIMUS, *olim Sal Tartari.* Pure Carbonate of Potash, *formerly Salt of Tartar.* Ed.

Take of impure Super-tartrate of Potash, any quantity. Having wrapped it up in moist bibulous paper, or put it into a crucible, burn it into a black mass, by placing it among live coals. Having reduced it to powder, subject it to a moderate heat, in an open crucible, until it become white, or at least of an ash-grey colour, care being taken that it do not melt. Then dissolve it in warm water; strain the liquor through linen, and evaporate it in a clean iron vessel, stirring the matter constantly, towards the end of the evaporation, with an iron spoon, that it may not adhere to the bottom of the vessel. A very white salt will remain, which is to be left a little longer on the fire, until the bottom of the vessel is nearly at a red heat. When cold, it is to be kept in glass vessels, well stopt.

KALI A TARTARO. Kali from Tartar. Dub.

Take of Crystals of Tartar, any quantity. Expose it to a red heat in a silver crucible lightly covered until it cease to emit vapours. Reduce the residual matter into coarse powder, and calcine it in the same crucible without a cover for two hours, stirring it constantly. Then boil it with twice its weight of water for a quarter of an hour, and after sufficient subsidence pour off the pure liquor. Let this be done thrice. Strain the mixed liquors, and evaporate in a silver vessel; bring the residual salt, as it becomes dry, into grains by frequent agitation; then expose it to a low red heat; remove it from the vessel before it is entirely cold; and keep it in phials well stopt.

By exposing super-tartrate of potash to heat, the tartaric acid is decomposed. Part of its carbon and oxygen unite, and form carbonic acid, which is attracted by the potash; and, by continuing the heat, the remaining carbonaceous matter is burnt out. The super-tartrate of potash of commerce usually contains a little tartrate of lime, which by the heat is converted into carbonate of lime; but by dissolving the saline matter in water, this, and any other earthy substances are separated, and, by evaporation, a salt is obtained, which, like the former, is a sub-carbonate of potash, but more pure. It appears also to contain rather a larger proportion of carbonic acid. The process, however, being more expensive than the preceding one, and not being attended with any adequate advantage, the product of it is not often to be found in the shops.

LIQUOR POTASSÆ SUB-CARBONATIS. Liquor of Sub-Carbonate of Potash. Lond.

Take of Sub-Carbonate of Potash, a pound; of Distilled Water, twelve fluidounces. Dissolve the sub-carbonate of potash in the water, and strain through paper.

AQUA SUB-CARBONATIS KALI. Water of Sub-Carbonate of Kali. Dub.

Take of Sub-Carbonate of Kali, any quantity. Put it into an open glass funnel, the throat of which is obstructed with linen. Put this aside in a cellar, that the salt may liquefy in the humid atmosphere. Receive the liquor in a vessel beneath.

The first of these liquors is a solution merely of the sub-carbonate of potash in water; the latter approaches nearer to the state of carbonate, as carbonic acid is absorbed from the air. Both are adapted principally to pharmaceutical use.

CARBONAS POTASSÆ. Carbonate of Potash. Lond.

Take of Sub-Carbonate of Potash, prepared from Tartar, a pound; Carbonate of Ammonia, three ounces; Distilled Water, a pint. Add to the potash dissolved in the water, the carbonate of ammonia; then, by a sand-bath, apply a heat of 180 degrees for three hours, or until the ammonia is expelled, and put the liquor aside that crystals may form. Let the residual liquor be reduced by evaporation, in a similar manner, so that when set aside it may again afford crystals.

The intention of this process is to obtain potash fully saturated with carbonic acid, or in the state of the neutral carbonate, the carbonic acid required for this being abstracted from the ammonia, and the ammonia itself being expelled. The same object is obtained with equal certainty and facility, by transmitting a current of carbonic acid gas through a solution of one part of sub-carbonate of potash, in three parts of water; and the salt obtained from this solution by spontaneous crystallization is probably more pure, as in the former method it is difficult to expel the ammonia entirely. The carbonate crystallizes in quadrangular prisms, which are not deliquescent: they are soluble in four parts of cold water. The taste of this salt is mild, but somewhat alkaline, and it changes the vegetable colours to a green. It is therefore disposed to crystallize with an excess of base, and is, in strictness of chemical language, a sub-carbonate. According to Pelletier, it consists of 40 of potash, 43 of carbonic acid, and 17 of water. It has been introduced as an antacid, in preference to the sub-carbonate, as being milder; and, from the much larger quantity of carbonic acid which it yields, it answers better for preparing the effervescing draught.

AQUA SUPER-CARBONATIS POTASSÆ. Water of Super-Carbonate of Potash. Ed.

Take of Water, ten pounds; Pure Carbonate of Potash, one ounce. Dissolve, and expose the solution to the current of Carbonic Acid Gas, which arises from three ounces of Powder of Carbonate of Lime, three ounces of Sulphuric Acid, and three pounds of Water, gradually and cautiously mixed. The chemical apparatus invented by Dr Nooth is well adapted to this preparation. But, if a larger quantity of the solution is required, the apparatus of Woulfe is preferable. The colder the air is, and the greater the pressure, the better will be the liquor. It ought to be kept in vessels well stopt.

Potash, when used as a lithontriptic, excites so much irritation in the stomach and bladder, that its use cannot well be long continued. But, when super-saturated with carbonic acid, as it is in this preparation, it is rendered more pleasant and less irritating; and, though its lithontriptic or real solvent power is diminished, or perhaps entirely lost, it is capable of acting as a palliative, and of being continued for any length of time; and from the observations already made under the class of lithontriptics, it follows, that no greater benefit is to be expected from the use of alkaline remedies under any form, and that it has even some peculiar advantages. It is taken to the extent of one, or even two pounds in the day. It affords also a grateful antacid. A solution of this kind has been in use for a considerable time; and to establish uniformity in its strength, it is inserted by the Edinburgh College as an officinal preparation. When properly prepared, it is pungent and acidulous, and sparkles when poured into a glass. By employing an apparatus, in which strong mechanical pressure can be applied, the solution may be still more impregnated with carbonic acid: it is thus rendered more grateful, and as an antacid, in particular, is perhaps rendered more effectual, the stimulus of the carbonic acid relieving the uneasy sensations connected with acidity of the stomach, while the alkali neutralizes the acid itself. It is often prepared in the shops with too small a proportion of alkali.

AQUA POTASSÆ, *vulgo Lixivium Causticum.* Water of Potash. Ed.

Take of newly prepared Lime, eight ounces; Carbonate of

Potash, six ounces. Put the lime into an iron or earthen vessel, with twenty-eight ounces of warm water. The ebullition being finished, immediately add the salt; and the whole being well mixed, close the vessel until they become cold. Let the cold materials, previously well agitated, be poured into a glass funnel, the tube of which is obstructed with clean linen. Cover the upper orifice of the funnel, while the neck of it is inserted in another glass vessel, that the water of potash may gradually drop through the linen into the lower vessel. When it first ceases to drop, pour into the funnel a few ounces of water, but cautiously, so that it may swim above the matter. The water of potash will again begin to drop. In this manner the affusion of water is to be repeated, until three pounds have filtered, which will be in the space of two or three days. The upper parts of the liquor are to be mixed with the lower by agitation, and it is to be kept in a vessel well stopt.

LIQUOR POTASSÆ. Liquor of Potash. Lond.

Take of Sub-Carbonate of Potash, newly prepared Lime, each a pound; of Boiling Distilled Water, a gallon. Dissolve the potash in two pints of the water. Add to the lime what remains of the water. Mix the liquors together while hot, then put them into a covered vessel, and after they are cold strain through cotton cloth. If any diluted acid dropt in, excite effervescence, it is necessary to add more lime, and again strain. A pint of this liquor ought to weigh sixteen ounces.

AQUA KALI CAUSTICI. Water of Caustic Kali. Dub.

Take of recently calcined Lime, eight ounces; Sub-Carbonate of Kali, six ounces. Sprinkle on the lime in an earthen vessel, two pints of boiling water, and when slaked mix the salt with it, and close the vessel. Put the mixture as soon as it has cooled into a glass funnel, the throat of which is stopt with linen. The funnel being covered, let the ley drop into a vessel beneath, pouring water on, until three pounds have dropt through. Agitate the liquor and preserve it in a vessel of green glass, well stopt. The ley, if properly prepared, will be free from colour and smell, and will scarcely effervesce when mixed with acids. If there is any sensible effervescence, add to it a little recently calcined lime reduced to a very fine powder; digest for twenty-four hours in a close vessel, agitating occasionally. Lastly, strain the ley in the manner above directed. The specific gravity of this liquor is to that of distilled water as 1100 to 1000.

In this process the lime abstracts the carbonic acid from the potash: it is difficult, however, to abstract it entirely, and hence the necessity for the peculiar arrangement employed, in which a large quantity of lime is used, and in which it is made to act in the most favourable manner by putting the mixture into a funnel, the tube of which is nearly obstructed, so that the alkaline solution must filtrate slowly through the mass of lime. The affinity of the lime to the carbonic acid is thus aided, and the greater part of the acid is abstracted from the potash. Still, however, from the effect of quantity on the force with which affinity is exerted, a small quantity of acid is retained in combination with the potash, which cannot be abstracted by this process. But if the lime has been in a sufficiently active state, and the directions duely observed, so that the filtration has been performed slowly, the quantity is very inconsiderable, as is apparent from scarcely any sensible effervescence being excited by the addition of an acid, and for any medicinal or pharmaceutical purpose to which the solution is applied may be neglected. The agency of the air must be excluded during the filtration, especially from the filtered liquid, to prevent absorption of carbonic acid; and for the same reason it must, after it is prepared, be kept in glass vessels well stopt. The medicinal applications of the alkali under this form have been already considered.

POTASSA, *olim Causticum Commune Acerrimum.* Potash. Ed.

Take of Water of Potash, any quantity. Evaporate it in a covered clean iron vessel, until, when the ebullition is finished, the saline matter flow smoothly like oil, which will happen before the vessel is at a red heat. Then pour it on a clean iron plate; cut it into small masses before it hardens, and immediately put them into a phial well stopt.

POTASSA FUSA. Fused Potash. Lond.

Take of Liquor of Potash, a gallon. Evaporate the water in a clean iron vessel, until the ebullition ceasing, the potash liquefies; then pour it upon an iron plate into proper forms.

KALI CAUSTICUM. Caustic Kali. Dub.

Take of Water of Caustic Kali, any quantity. Evaporate it in a very clean iron vessel, until the ebullition having ceased, the saline matter, on increasing the heat, nearly remains tranquil in the vessel. Pour out this melted salt on an iron plate, and while it is becoming concrete, cut it into proper pieces, which put immediately into a phial well stopt. During the evaporation, the operator should avoid the drops of liquid thrown out from the vessel.

By the dissipation of the water in this process, the alkali is obtained in a solid form, though it still retains a quantity of water in intimate combination: it is usually run into moulds, so as to be formed into cylindrical pieces. Under this form it is used as a caustic; it quickly erodes animal matter, and, mixed with soap into a paste, is sometimes used to open an ulcer.

POTASSA CUM CALCE, *olim Causticum Commune Mitius.* Potash with Lime. Ed.

Take of Water of Potash, any quantity. Evaporate it to one-third in a covered iron vessel; then mix with it as much newly slaked lime as may be sufficient to give it the consistence of a solid paste, which is to be kept in a stopt vessel.

POTASSA CUM CALCE. Potash with Lime. Lond.

Take of the Liquor of Potash, three pints; of newly Prepared Lime, a pound. Boil the liquor of potash to a pint; then add the lime slaked by the water having been poured upon it, and mix them carefully.

KALI CAUSTICUM CUM CALCE. Caustic Potash with Lime. Dub.

Evaporate the Water of Caustic Potash to a third part; then add of recently Calcined Lime reduced to powder, as much as may form a mass of a proper consistence, which is to be kept in a vessel well stopt.

As a caustic, this is milder than the former preparation, and it has the advantage of being less deliquescent, so that it can be more easily confined to the part to which it is applied. When mixed, however, with the requisite quantity of soap to form a paste, it is scarcely sufficiently active.

ACETIS POTASSÆ. Acetite of Potash. Ed.

Take of Pure Carbonate of Potash, one pound. Boil it with a gentle heat in four or five times its weight of Distilled Acetous Acid, and add more acid at different times, until, on the watery part of the former portion being nearly dissipated by evaporation, the acid newly added excite no effervescence: this will happen when about twenty pounds of acid have been consumed. Afterwards evaporate to dryness slowly. Let the remaining impure salt be liquefied with a gentle heat, for a short time; then dissolved in water, and strained through paper. If the liquefaction has been properly done, the strained liquor will be limpid; if not, of a brown colour. Afterwards evaporate with a very gentle heat this liquor, in a shallow glass vessel, stirring the salt while it concretes, that it may more quickly be brought to dryness. Lastly, the acetite of potash ought to be kept in a glass vessel, well closed, that it may not liquefy from the action of the air.

POTASSÆ ACETAS. Acetate of Potash. Lond.

Take of Sub-carbonate of Potash, a pound and a half; of Acetic

Acid, a gallon. Mix them together in a large glass vessel, and the liquor being evaporated to one half, drop in gradually of acetic acid as much as may be sufficient to full saturation. Let the liquor be again evaporated to a half, and strained; then evaporate in a water bath, so that on being removed from the fire, it may pass into crystals.

ACETAS KALI. Acetate of Potash. Dub.

Take of Sub-carbonate of Potash, any quantity. Add to it at different times of Distilled Vinegar, moderately heated, rather more than five times its weight. When the effervescence has ceased, and the liquor has been partly evaporated, add again at intervals, Distilled Vinegar, until the mixture ceases to effervesce: the evaporation being continued, a dry salt will be produced, which increasing the heat a little, liquefy cautiously. Dissolve it when cold in water, strain the liquor, and boil it down, until when removed from the fire, in cooling it pass into a mass of crystals perfectly white. Put these immediately into phials well stopt.

In this process, the acetic acid of the distilled vinegar combines with the potash, disengaging the carbonic acid. The acetate of potash, obtained by the evaporation, is liable to be of a brownish colour, from the presence, probably, of a little extractive matter, derived from the vinegar. It is freed from this, either by boiling the solution with charcoal powder, or, as directed in the Pharmacopœia, by melting the salt; and, by the second solution and evaporation, it is obtained in the form of a white foliated mass; the foliated structure, which is very characteristic of this salt, arising from a species of crystallization.

Acetate of potash is extremely deliquescent, becoming humid in a very short time from exposure to the air. It does not require so much as half its weight of water for its solution, at the temperature of 60°: it proves moderately laxative, and was at one time celebrated as a diuretic, in a dose of one or two drachms; but it has now nearly fallen into disuse.

SULPHAS POTASSÆ, *olim Tartarum Vitriolatum.* Sulphate of Potash. Ed.

Take of Sulphuric Acid, diluted with six times its weight of Water, any quantity. Put it into a large glass vessel, and gradually drop into it, of Carbonate of Potash, dissolved in six times its weight of water, as much as may be necessary to the perfect saturation of the acid. The effervescence being over, strain the liquor through paper; and, after due evaporation, put it aside, that crystals may form. Sulphate of Potash may also be conveniently made, by dissolving the residuum of the distillation of Nitrous Acid in Warm Water, and saturating it by adding Carbonate of Potash.

POTASSÆ SULPHAS. Sulphate of Potash. Lond.

Take of the Salt which remains after the distillation of Nitric Acid, two pounds; of Boiling Water, two gallons. Mix them, that the salt may be dissolved; then add of sub-carbonate of Potash, as much as will be sufficient to saturate the acid. Afterwards boil it until a pellicle appear on the surface, and when strained, put it aside, that crystals may be formed. Having poured off the water, dry them on bibulous paper.

SULPHAS KALI. Sulphate of Potash. Dub.

Dissolve the Salt which remains after the distillation of Nitrous Acid, reduced to powder, in a sufficient quantity of boiling water; add as much Pearl-ash as may be necessary to saturate the superfluous acid. The liquor being strained, evaporate it with a moderate heat, so that crystals may form.

In the first of the processes of the Edinburgh Pharmacopœia, the sulphuric acid unites with the potash of the carbonate of potash, and expels the carbonic acid with effervescence, the sulphate of potash remaining in solution. The second process, which is that also of the other Pharmacopœias, being more economical, is always followed. The salt remaining after the distillation of nitrous acid is sulphate of potash, with a considerable excess of sulphuric acid: this excess of acid is neutralized by the potash of the carbonate of potash. The neutral salt forms only in small crystals, the figure of which is a four-sided or six-sided prism, acuminated by four or six planes: by slow evaporation they are obtained of a larger size. They require seventeen parts of cold water for their solution. The taste of the salt is bitter. Its powers are those of a cathartic, in the dose of half an ounce; but it is more usually given in smaller doses as an aperient, and, from its sparing solubility, is given usually in powder, and frequently in combination with some of the vegetable purgatives.

SULPHAS POTASSÆ CUM SULPHURE, *olim Sal Polychrestus.* Sulphate of Potash with Sulphur. Ed.

Take of Nitrate of Potash in powder, Sublimed Sulphur, equal weights. Throw them well mixed together, in small quantities at a time, into a red-hot crucible. The deflagration being finished, let the salt cool, and keep it in a glass phial, well stopt.

The nitrate of potash being decomposed at a red heat, affords oxygen to the sulphur, in such proportions as to convert it principally into sulphuric, and partly into sulphurous acids. Both acids are attracted by the potash; and it appears even that from the rapidity of the deflagration, a portion of the sulphur escapes oxygenation, and remains united with a portion of the alkali in the state of sulphuret. This is therefore a mingled product. In its medicinal qualities, it does not appear to differ from the sulphate of potash; and it is soon converted into it, by exposure to the air. Hence it is little used.

POTASSÆ SUPER-SULPHAS. Super-Sulphate of Potash. Lond.

Take of the Salt which remains after the distillation of Nitric Acid, two pounds; Boiling Water, four pints. Mix them, so that the salt may be dissolved, and strain. Then boil the solution until a pellicle appear on its surface, and put it aside that crystals may form. The liquor being withdrawn, dry these on bibulous paper.

By solution in water, the free acid of the residual mass is in part removed, but the salt still crystallizes with an excess of acid. It is much more soluble than the neutral sulphate, but it is not apparent to what medicinal use it can be applied, with any peculiar advantage; and it appears liable to variation in its composition, from the extent of evaporation, and other circumstances connected with its formation.

TARTRIS POTASSÆ, *olim Tartarum Solubile.* Tartrite of Potash. Ed.

Take of Carbonate of Potash, one pound; Super-Tartrite of Potash, three pounds, or as much as may be necessary; Boiling Water, fifteen pounds. To the carbonate of potash dissolved in the water, add, by small quantities, the Super-Tartrite of Potash rubbed to a fine powder, as long as it excites effervescence, which generally ceases before three times the weight of the carbonate of potash have been thrown in. Then strain the liquor, when cold, through paper; and, after due evaporation, put it aside that crystals may form.

POTASSÆ TARTRAS. Tartrate of Potash. Lond.

Take of Sub-Carbonate of Potash, a pound; of Super-Tartrate of Potash, three pounds; of Boiling Water, a gallon. Dissolve the sub-carbonate of potash in the water; then add the super-tartrate of potash into powder, until ebullition is no longer excited. Strain the liquor through paper; afterwards boil it until a pellicle appear, and put aside, that crystals may form. Having poured off the liquor, dry them on bibulous paper.

TARTARAS KALI. Tartrate of Potash. Dub.

Take of Sub-Carbonate of Potash, a pound; Crystals of Tartar in fine powder, two pounds and a half, or as much as may be necessary to saturate the potash; Boiling Water, a gallon. To the sub-carbonate of potash dissolved in the water, add the tartar gradually. Evaporate the strained liquor, and put it aside that crystals may form by cooling.

The excess of tartaric acid in the super-tartrate of potash is in this process saturated by the potash of the carbonate of potash, and the proper neutral salt is formed. Though ordered to be crystallized in all the Pharmacopœias, the crystallization of it can scarcely be accomplished by hasty evaporation. In its preparation, therefore, the solution is usually evaporated to dryness, and it is kept in powder in the shops.

This salt has a bitter taste; it is very soluble in water, requiring only four parts of cold water for its solution; and from this greater solubility compared with that of the super-tartrate, it derived its name of Soluble Tartar: it is slightly deliquescent. The portion of alkali producing neutralization is retained by a very weak affinity: even the weaker acids decompose it partially, and reduce it to the state of super-tartrate. As a mild purgative, it is given in the dose of one ounce.

SULPHURETUM POTASSÆ, *olim Hepar Sulphuris.* Sulphuret of Potash. Ed.

Take of Carbonate of Potash, Sublimed Sulphur, of each eight ounces. Having rubbed them together, put them into a large coated crucible; and a cover being adapted to it, apply the fire to it cautiously, until they melt. The crucible, after it has cooled, being broken, remove the sulphuret, and preserve it in a phial well stopt.

POTASSÆ SULPHURETUM. Sulphuret of Potash. Lond.

Take of Washed Sulphur, an ounce; of Sub-Carbonate of Potash, five ounces. Rub them together, and put them into a close crucible upon the fire until they unite.

SULPHURETUM KALI. Sulphuret of Potash. Dub.

Take of Sub-Carbonate of Potash, Sublimed Sulphur, of each two ounces. Put them mixed together into a crucible, and applying a cover, expose them to a fire gradually raised, until they unite.

During the fusion of the two substances, the sulphur and potash combine, and the carbonic acid is disengaged, only partially, however, and hence the combination is less perfect than when the sulphur is melted with the pure alkali. From the larger proportion of potash, ordered in the formula of the London College, the combination is probably more perfect, and the whole sulphur will be rendered soluble in water. The compound is easily fusible, and is of yellowish green, or brown colour, and inodorous, but becomes fœtid when moistened or dissolved in water from partial decomposition, and the production of a compound of sulphur and hydrogen. It has been proposed to be used as an antidote to some of the metallic poisons, from the supposition that the sulphur will combine with the metallic preparation, and render it inert. From a similar theory, it has been imagined that it might obviate the effects of mercury on the system when these are too violent: but it is very seldom had recourse to with either intention, and it is doubtful if much advantage would be derived from it. The dose in which it has been proposed to be given is from ten to twenty grains, three or four times a-day. It is said, in some cases of cancer, to have increased the efficacy of cicuta as a palliative, in doses of five grains. Externally, it has been recommended in tinea capitis; a wash prepared from three drachms of it with one ounce of soap, dissolved in eight ounces of lime water, with the addition of two drachms of ardent spirit, being applied to the scalp.

AQUA SULPHURETI KALI. Water of Sulphuret of Potash. Dub.

Take of Sublimed Sulphur, half an ounce; of Water of Potash, nine ounces. Boil them together for ten minutes, and filter the liquor through paper. Keep it in phials closely stopt. The specific gravity of this liquor is to that of distilled water as 1120 to 1000.

The alkali in its pure form, and in this state of solution, acts readily on the sulphur and dissolves it, the liquor being of a dark yellow or red colour. It is not merely, however, a solution of sulphuret of potash in water; for whenever sulphur is combined with an alkaline base, it partially decomposes water, and in the state of solution, therefore, a new compound is formed. The nature of their re-action is somewhat complicated. A portion of the sulphur attracts a portion of the oxygen of the water, and the sulphuric acid thus formed is combined with a part of the alkaline base. The hydrogen of the decomposed water enters into union with the remaining sulphur, forming the compound with excess of sulphur, named Super Sulphuretted Hydrogen, and this remains combined with the rest of the base, forming what some chemists have named a Hydroguretted Sulphuret,—what may be distinguished by the less harsh appellation of a Sulphuretted Hydro-sulphuret. The solution, as prepared by the above formula, is adapted to the same uses as the sulphuret of potash.

CARBONAS SODÆ. Carbonate of Soda. Ed.

Take of Impure Carbonate of Soda, any quantity. Bruise it, and boil it in water until all the saline matter is dissolved. Strain the solution through paper, and evaporate it in an iron vessel, so that on cooling crystals shall form.

SODÆ SUB-CARBONAS. Sub-carbonate of Soda. Lond.

Take of Impure Soda rubbed down, a pound; of Distilled Boiling Water, a gallon. Boil the soda in the water for half an hour, and strain. Evaporate to two pounds, and put aside, that crystals may form. Reject the residual liquor.

CARBONAS SODÆ. Carbonate of Soda. Dub.

Take of Barilla in powder, ten pounds; Water, two gallons. Boil the barilla in the water for two hours in a close vessel, agitating frequently; strain the liquor, and the residuum of the barilla being again rubbed, boil in an equal quantity of water; repeat this a third time. The leys being strained and mixed, are to be evaporated to dryness in an open iron vessel, taking care that the heat is not raised so high as to liquefy the saline matter which remains; stir this with an iron spatula until it become white; lastly, dissolve it in boiling water, and after due evaporation, put it aside, that by slow cooling, crystals may form. These will be purer, if before each boiling the barilla be exposed for some time to the air. The crystals ought to be formed when the temperature of the air is nearly that of freezing water, and the specific gravity of the liquor is to that of distilled water, as 1220 to 1000. If the salt is not sufficiently pure, repeat the solution and crystallization.

The barilla of commerce, from which this salt is ordered to be prepared, is the residual matter of the combustion of marine plants. It is a very impure sub-carbonate of soda, containing large quantities of other saline and earthy matter, chiefly sulphate and muriate of soda, lime, magnesia, argil and silex, with charcoal. The sub-carbonate of soda crystallizing readily, the solution on being evaporated affords it nearly pure in the crystals which first form. The residual liquor, containing more of the other salts, ought to be rejected, a direction properly given in the formula of the London Pharmacopœia. From three to five ounces of the crystallized salt are obtained from a pound of barilla. As the salt has an excess of base, it is improperly named Carbonate by the Edinburgh and Dublin Colleges.

This crystallized salt, though mild to the taste, is sensibly alkaline, and changes the vegetable colours to a green. It crystallizes in octohedrons; its crystals are efflorescent; they require not more than twice their weight of cold water for their solution; and by a heat inferior to that of 212° are liquefied by the action of the very large quantity of water of crystallization they contain. Its quantity amounts to 64 parts in 100, with 21.6 of soda, and 14.4 of carbonic acid. The use of this salt as a lithontriptic has been already stated.

SODÆ SUB-CARBONAS EXSICCATA. Dried Sub-carbonate of Soda. Lond.

Take of Sub-earbonate of Soda, a pound. Submit it to the heat of boiling water in a clean iron vessel until it is perfectly dry, stirring it constantly with an iron spatula. Then rub it into powder.

CARBONAS SODÆ SICCATUM. Dried Carbonate of Soda. Dub.

Liquefy the crystals of Carbonate of Soda in a silver crucible placed on a fire; then increase the heat, and stir the melted salt, until by the evaporation of its water, it become dry. This being rubbed to powder is to be kept in close phials.

Carbonate of soda has been given as a lithontriptic, principally mixed with soap, under the form of pill. If the crystallized salt be used, besides the addition to its bulk from the water of crystallization, it effloresces, so that the pill prepared from it soon loses its cohesion. The dried carbonate is therefore preferable; and from the moderate heat to which it is exposed in the drying, the water merely is expelled, without any farther change in the composition of the salt.

**Sodæ carbonas.** Carbonate of Soda. Lond.

Take of Sub-carbonate of Soda, a pound; Sub-carbonate of Ammonia, three ounces; Distilled Water, a pint. To the sub-carbonate of soda dissolved in the water, add the ammonia; then by a sand-bath apply a heat of 180° for three hours, or until the ammonia is expelled, and put it aside that crystals may form. Let the remaining liquor be evaporated in a similar manner, and put aside that crystals may again be produced.

The sub-carbonate of soda receives in this process carbonic acid from the carbonate of ammonia, and is brought to the neutral state, while the ammonia is expelled by the heat. The quantity of carbonate of ammonia employed is unnecessarily large, and even with this excess, the neutralization of the soda is rather imperfect, being probably counteracted by the heat applied. The neutralization might be effected more directly and economically, by transmitting a current of carbonic acid gas through the solution of the sub-carbonate. The salt in this state is milder than the sub-carbonate: it is therefore more grateful when used as an antacid dissolved in water; and from the larger quantity of carbonic acid it contains, it is also better adapted to the preparation of the effervescing draught.

**Aqua super-carbonatis sodæ.** Water of Super-carbonate of Soda. Ed.

This is to be prepared from ten pounds of Water, and two ounces of Carbonate of Soda, in the same manner as the Water of Super-carbonate of Potash.

The proportion of the carbonate to the water is greater in this preparation than in that of the super-carbonate of potash water; but this is owing to the carbonate of soda containing so much water of crystallization, that even with the enlarged proportion, there is not more real alkali in the one than in the other. The super-carbonated soda water is used as a lithontriptic in the same dose as the super-carbonated potash water, and is usually preferred, on the supposition of being more pure and mild. It is also in common use as an antacid, applications of it which have been already noticed.

TARTRIS POTASSÆ ET SODÆ, *olim Sal Rupellensis.* Tartrite of Potash and Soda. Ed.

This is prepared from Carbonate of Soda and Super-tartrate of Potash, in the same manner as Tartrate of Potash.

SODA TARTARIZATA. Tartarized Soda. Lond.

Take of Sub-carbonate of Soda, twenty ounces; of Super-tartrate of Potash in powder, two pounds; of Boiling Water, ten pints. Dissolve the sub-carbonate of soda in the water, and gradually add the super-tartrate of potash. Strain the liquor through paper, then boil it, until a pellicle appear, and put aside that crystals may form. Having poured off the water, dry them on bibulous paper.

TARTARAS SODÆ ET KALI. Tartrate of Soda and Potash. Dub.

Take of Carbonate of Soda, twenty ounces; Crystals of Tartar, rubbed to a fine powder, two pounds; Boiling Water, ten pints. To the sub-carbonate of soda dissolved in the water, add gradually the tartar; the liquor being strained through paper, evaporate, and put it aside, that on slow cooling, crystals may form.

The excess of tartaric acid in the super-tartrate of potash, being saturated in this preparation by the soda of the carbonate of soda, a triple salt is formed, properly named Tartrate of Potash and Soda. It crystallizes in rhomboidal prisms; is soluble in five parts of water at 60°, and has a bitter saline taste. It consists, as Vauquelin has stated its composition, of 54 parts of tartrate of potash, and 46 of tartrate of soda. It is employed as a cathartic, in the dose of one ounce, being given dissolved in tepid water, with frequently the addition of manna and of peppermint water, or tincture of cardamom; and is often preferred, as being less disagreeable than the greater number of the saline cathartics.

PHOSPHAS SODÆ. Phosphate of Soda. Ed.

Take of Bones, burnt to whiteness, and reduced to powder, ten pounds; Sulphuric Acid, six pounds; Water, nine pounds. Mix the powder in an earthen vessel with the sulphuric acid; then add the water, and again mix them. Keep the vessel in the vapour arising from boiling water for three days; at the end of which, dilute the matter, by adding other nine pounds of Boiling Water, and strain through a strong linen-cloth, pouring over it gradually, boiling water, until the whole acid is washed out. Put aside the strained liquor, that the impurities may subside, from which pour it off, and, by evaporation, reduce it to nine pounds. To this liquor, again poured off from the impurities, and heated in an earthen vessel, add Carbonate of Soda dissolved in warm water, until the effervescence cease. Then strain, and put it aside that crystals may form. These being removed, add, if necessary, to the liquor, a little Carbonate of Soda, that the phosphoric acid may be exactly saturated; and prepare it, by evaporation, again to form crystals, as long as these can be produced. Lastly, let the crystals be kept in a vessel well stopt.

PHOSPHAS SODÆ. Phosphate of Soda. Dub.

Take of Burnt Bones beat to powder, five pounds; Sulphuric Acid, three pounds and a half. Mix the powder with the sulphuric acid in an earthen vessel; add gradually five pints of water, and stir the mixture. Digest for three days, adding occasionally more water, lest the matter become dry, and continue the stirring; then pour upon it five pints of boiling water, and strain through a linen cloth, pouring on boiling water repeatedly, until the acid is entirely washed out. Put aside the liquor that the impurities may subside, then pour it off pure, and reduce it by evaporation to one half. Lastly, add carbonate of soda, (dissolved in a sufficient quantity of warm water), three pounds and ten ounces; strain, and by repeated evaporation and cooling, form crystals, which are to be kept in a vessel well stopt. If the salt is not sufficiently pure, repeat the solution and crystallization.

The white residuum of burnt bones consists chiefly of phosphate of lime. The sulphuric acid partially decomposes it, by combining with the lime; the phosphoric acid which is disengaged, in conformity to the law of chemical attraction, that quantity of matter influences affinity, and that in all cases where two acids act on a base, there is a participation of this base between them, in proportions determined by their respective quantities and affinities, retains a quantity of lime combined with it, forming a soluble compound. When carbonate of soda is added to the acidulous liquor obtained by washing the materials, the soda combines with the free phosphoric acid, and the lime retaining as much phosphoric acid in combination as forms neutral phosphate of lime, is precipitated; the phosphate of soda crystallizes on evaporation of the strained liquor. Its crystals are rhomboidal prisms, and are obtained of a regular figure only in crystallizing with a slight excess of alkali. Hence the liquor should be slightly alkaline; and from the tendency of the salt to crystallize with an excess of base, it is necessary, though the neutralization may have been perfect, to add, previous to the second crystallization, a little carbonate of soda, as directed in the formula of the Edinburgh Pharmacopœia. The crystals are efflorescent; they are soluble in little more than three parts of cold, and in half that quantity of boiling water. They consist, according to Thenard, of 19 of soda, 15 of acid, and 66 of water. The taste of this salt is purely saline, without any bitterness; its medicinal operation is that of a mild cathartic, and, from being less nauseous to the taste than the other salts, it is entitled to preference. Its dose is one ounce, given generally dissolved in six ounces of tepid water, with the addition of a little peppermint, or any other grateful aromatic.

SULPHAS SODÆ, *olim Sal Glauberi.* Sulphate of Soda. Ed.

Dissolve the Acidulous Salt, which remains after the distillation of muriatic acid, in Water; and add to it, Carbonate of Lime in powder, to remove the superfluous acid. Put it aside until the impurities have subsided; then having poured off the liquor, and strained it through paper, reduce it by evaporation, that crystals may be formed.

SULPHAS SODÆ. Sulphate of Soda. Lond.

Take of the Salt which remains after the distillation of Muriatic Acid, two pounds; of Boiling Water, two pints and a half. Dissolve the salt in the water; then add gradually of Sub-carbonate of Soda, as much as will be sufficient to saturate the acid. Boil until a pellicle appear, and when the liquor is strained, put it aside, that crystals may form. Having poured off the water, dry them on bibulous paper.

SULPHAS SODÆ. Sulphate of Soda. Dub.

Dissolve the Salt which remains after the distillation of muriatic acid in a sufficient quantity of boiling water. Put aside the strained liquor after due evaporation, that crystals may form by slow cooling.

In the decomposition of muriate of soda by sulphuric acid, to prepare muriatic acid, more sulphuric acid is used than is necessary merely to saturate the soda, advantage being gained from its quantity adding to its affinity, as has been already explained; hence the necessity of removing the excess of acid in the residual mass, to obtain the neutral sulphate. In the Edinburgh Pharmacopœia, this is ordered to be done by carbonate of lime. The London College order the excess of acid to be neutralized by carbonate of soda, on the supposition of its being more economical, as increasing the quantity of salt, but from the price of the soda, it is less so. Slaked lime is preferable to either, as it decomposes a little muriate of iron, which adheres to the salt. This salt is also obtained as a residuum in some other processes, particularly in the preparation on a large scale of muriate of ammonia, the Sal Ammoniac of commerce. It crystallizes in hexaedral prisms; they are efflorescent and soluble in rather less than three parts of cold water. They consist of 18.48 of soda, 23.52 of acid, and 58 of water. Sulphate of soda has long been in use as a cathartic: it operates with sufficient power and certainty, but is liable to occasion nausea, from its very bitter taste. Its medium dose is an ounce and a half.

MURIAS SODÆ SICCATUM. Dried Muriate of Soda. Dub.

Take of Muriate of Soda, any quantity. Calcine it over the fire in an iron vessel, lightly covered, until it cease to decrepitate, stirring it occasionally.

This is designed merely to prepare the muriate of soda for the process of the distillation of muriatic acid, as already noticed.

CARBONAS AMMONIÆ, *olim Ammonia Præparata.* Carbonate of Ammonia. Ed.

Take of Muriate of Ammonia, one pound; Carbonate of Lime, commonly called Chalk, dried, two pounds. Each being separately reduced to powder, mix them, and sublime from a retort into a receiver kept cold.

AMMONIÆ CARBONAS. Carbonate of Ammonia. Lond.

Take of Muriate of Ammonia, a pound; of Prepared Chalk dried, two pounds. Rub them separately to powder, then mix, and sublime with a heat gradually increased, until the retort is red.

CARBONAS AMMONIÆ. Carbonate of Ammonia. Dub.

Take of Muriate of Ammonia, reduced to powder and well dried, Carbonate of Soda dried, of each half a pound. Put them mixed together into an earthen retort, and sublime with a heat gradually raised into a receiver kept cold.

In this process, as given in the two first formulas, the muriatic acid of the muriate of ammonia combines with the lime of the carbonate of lime, and the carbonic acid of the latter unites with the ammonia of the former; the exertion of these new affinities being determined by the heat applied. The carbonate of ammonia which is formed is sublimed, and is obtained in a crystalline cake. When the process is carried on in the large way, the sublimation is generally performed from an iron pot, to which the heat is directly applied, and which is connected with a large earthen or leaden receiver. The Dublin College, in place of carbonate of lime, order carbonate of soda; with this the application of so high a heat will not be required; but not being sufficiently economical, the direction will not be attended to by the practical chemist. The proportion of carbonate of lime ordered by the other two Colleges, is probably too large, and the excess by adding to the mass of materials, adds to the expence of the vessels and fuel.

According to the experiments of Davy, carbonate of ammonia varies in the proportions of its ingredients according to the heat applied in its preparation; they vary so much as from 20 to 50 parts of ammonia in 100, the ammonia being in larger proportion, as the temperature at which the carbonate has been formed is high; that formed at a temperature of 300° containing 50 parts of alkali, while that produced at a temperature of 60° contains only 20 parts. Still in all these proportions the product is a sub-carbonate; it is not, therefore, properly named in the Pharmacopœias; its smell is pungent and ammoniacal, and it changes the vegetable colours to a green: It is very volatile, abundantly soluble in water, and is efflorescent on exposure to the air. Its medicinal uses are as a stimulant applied to the nostrils in fainting, and as a stimulant and diaphoretic, taken internally, in a dose of from five to fifteen grains. It has been employed with some advantage too in scrofula, combined with bitters.

AQUA CARBONATIS AMMONIÆ, *olim Aqua Ammoniæ.* Water of Carbonate of Ammonia. Ed.

Take of Muriate of Ammonia, Carbonate of Potash, of each sixteen ounces; Water, two pounds. To the salts, mixed and put into a glass retort, add the water; then distil from a sand-bath, with a fire gradually raised, to dryness.

LIQUOR AMMONIÆ CARBONATIS. Liquor of the Carbonate of Ammonia. Lond.

Take of Carbonate of Ammonia, eight ounces; of Distilled Water, a pint. Dissolve the carbonate of ammonia in the water, and strain through paper.

AQUA CARBONATIS AMMONIÆ. Water of Carbonate of Ammonia. Dub.

Take of Muriate of Ammonia, a pound; Carbonate of Soda, twenty-eight ounces; Water, three pints. Distil two pints with a fire gradually raised.

In this preparation of carbonate of ammonia the humid way, carbonate of lime, from its insolubility, could not be employed to decompose the muriate of ammonia, as it is in the dry way; an alkaline carbonate is therefore employed. The alkali, whether potash or soda, attracts the muriatic acid, while the ammonia combines with the carbonic acid. The carbonate, or rather sub-carbonate of ammonia is volatilized and dissolved by the watery vapour. From the substitution of carbonate of soda, for that of potash by the Dublin College, a larger quantity of carbonic acid will probably be combined with the ammonia.

In the formula given by the London College, the proportion of the solid carbonate of ammonia to the water is too large. According to Mr Phillips, the water at 60° dissolves only about one-fourth of its weight.

The water of carbonate of ammonia is applied to the same medicinal purposes as the concrete carbonate, and as being more convenient is generally prescribed for internal use.

### LIQUOR VOLATILIS CORNU CERVINI. Volatile Liquor of Hartshorn. Dub.

Take of Hartshorn, any quantity. Put it into a retort, and distil, with a heat gradually raised, a volatile liquor, salt, and oil. Distil the volatile liquor repeatedly until it become limpid as water, separating, after each distillation, the salt and oil by filtration. The liquor will be purified more easily, if, after each distillation except the first, there be added to it a sixth part of its weight of charcoal, previously made red hot, extinguished by being covered with sand, and reduced to powder while hot. If hartshorn cannot be procured in sufficient quantity, the bones of any land animals may supply its place.

This is a process which has long been employed in Pharmacy. The animal matter, principally the gelatin of the bones, at an elevated temperature suffers decomposition, and its principles enter into new combinations, forming chiefly carbonate of ammonia and empyreumatic oil. The carbonate of ammonia is partly dissolved by the water which distils over, and obtained partly in a concrete state. It is always contaminated, however, with the empyreumatic oil, which renders it nauseous; and though at one time it was supposed, from this impregnation, to be possessed of some peculiar virtues, this probably had no just foundation, and it is now rejected from practice. If sublimed from charcoal powder, the oily matter is completely removed; but then it differs in nothing from the carbonate of ammonia obtained by the preceding processes, and the process, with these repeated operations, is not more economical.

AQUA AMMONIÆ, *olim Aqua Ammoniæ Causticæ.* Water of Ammonia. Ed.

Take of Muriate of Ammonia, one pound; Lime, recently prepared, a pound and a half; Distilled Water, one pound; Water, nine ounces. Pour the water upon the lime bruised in an iron or earthen vessel, closing the vessel until the lime, having fallen into powder, has become cold; then mix the muriate, beat to a very fine powder, with the lime, rubbing them together in a mortar, and then put them into a retort of the coarser glass, *(bottle glass)*. Let the retort be placed in a sand-bath, and connect with it properly the apparatus of Woulfe. In the first bottle, of smaller size than the others, furnished with a tube of safety, put two ounces of distilled water; and in the second vessel what remains of the distilled water. Then apply the fire, increasing gradually until the bottom of the iron pot is at a red heat, and as long as the ammonia is produced. Mix the liquor from both bottles, and let it be kept in small phials well stopt.

LIQUOR AMMONIÆ. Liquor of Ammonia. Lond.

Take of Muriate of Ammonia, newly prepared Lime, each two pounds; of Water, a pint and a half. Rub the muriate of ammonia and the lime separately to powder; then mix, and put them into a large glass retort, into which a pint of water has been previously put. To the retort placed in a sand-bath adapt a tubulated receiver, through which the ammonia may pass into a third vessel kept cold, containing eight fluidounces of water. Then apply heat at first gentle, and increase it gradually until the retort is red.

AQUA AMMONIÆ CAUSTICÆ. Water of Caustic Ammonia. Dub.

Take of Muriate of Ammonia, sixteen ounces; recently Calcined Lime, two pounds; Water, six pints. Sprinkle on the lime, put into an earthen vessel, a pound of water, and close the vessel. After twenty-four hours, mix the salt with the lime now fallen into powder, avoiding the vapours; then put the mixture into a retort, and pour upon it the rest of the water. After agitation, distil with a moderate heat, into a receiver kept cold, twenty ounces by measure of liquor, having secured well the joinings of the vessels by lute. The specific gravity of this liquor is to that of distilled water as 936 to 1000.

In these processes, the lime combines with the muriatic acid of the muriate of ammonia, and the ammonia is disengaged. Being permanently elastic, it is condensed only by combination with the water, and this is effected either by distilling water at the same time from the materials, or by transmitting the ammoniacal gas through water. The Edinburgh and London Colleges have preferred the latter mode, and they obtain a solution in this way, perhaps more strongly impregnated; the other is rather more easily conducted, and affords a product sufficiently strong for any medicinal or pharmaceutical purpose. In the mode directed by the London College, there are the obvious objections, that the lime being slaked in the retort, there must be the risk of the glass breaking from the sudden and unequal heat; the ammoniacal gas is also rapidly disengaged, to the annoyance of the operator; the quantity of water is not sufficient for its condensation, and the solution that is obtained is much stronger than that to which practitioners have been accustomed. The College have neglected too to adapt this increased strength to the other officinal preparations into which it enters, so as to preserve them nearly of their former powers. Hence they are now much more pungent and acrid.

When this process is conducted on a large scale, an iron still is employed, into which the materials are put, and to which the fire can be directly applied; the head of the still being connected with a spiral tube placed in a refrigeratory, to the extremity of which, besides the recipient to collect the condensed product, two or three receivers are adapted, containing water to absorb any ammoniacal gas. A modification of this apparatus might be advantageously used on a small scale, at least it would be economical to expose the dry mixture of the muriate and the lime to heat in an iron bottle, and condense the ammoniacal gas by receiving it in water.

Water, under a common atmospheric pressure, and at a temperature below 50°, absorbs about one-third of its weight of gas; and by this combination its specific gravity is diminished, that of the saturated solution being not more than 9054. It is seldom so completely impregnated. By the mode directed by the Dublin College, which is that usually followed, the solution is obtained of the specific gravity of 936; and when of this strength, it contains about 16 of ammonia in 100 parts. Its smell is strong and pungent; its taste extremely acrid, and it inflames the skin. Though its odour is pungent, it ought to be free from any fœtor. It is employed in medicine as a stimulant and diaphoretic, internally, in a dose from twenty to thirty drops, and sometimes as an emetic in a larger dose diluted with water. Externally it is used as a stimulant applied to the nostrils, and as a rubefacient; with the latter intention it is applied mixed with oil, or with soap liniment.

ALKOHOL AMMONIATUM, *olim Spiritus Ammoniæ.* Ammoniated Alkohol. Ed.

Take of Alkohol, thirty-two ounces; recently prepared Lime, twelve ounces; Muriate of Ammonia, eight ounces; Water, eight ounces. From these, prepare the Ammoniated Alkohol in the same manner as the water of ammonia, and preserve it in a similar manner.

SPIRITUS AMMONIÆ. Spirit of Ammonia. Dub.

Take of Proof-spirit, three pints; Muriate of Ammonia, four ounces; Pearl-ash, six ounces. Mix and distil two pints with a moderate heat.

SPIRITUS AMMONIÆ. Spirit of Ammonia. Lond.

Take of Rectified Spirit, two pints; Liquor of Ammonia, one pint. Mix.

In the process of the Edinburgh Pharmacopœia, the lime combining with the muriatic acid of the muriate, disengages the ammonia which is condensed by the alkohol. In that of the Dublin Pharmacopœia, which had also a place in the former edition of the Edinburgh, the decomposition is produced by the sub-carbonate of potash. A sub-carbonate of ammonia is thus disengaged with a considerable excess of ammonia: in this state it is dissolved by the alkohol, especially as the distillation is continued until a spirit weaker than alkohol is distilled over; and the more watery portion of this, towards the end of the distillation, dissolves a portion of sub-carbonate of ammonia, which at that stage of the process condenses in a concrete form on the sides of the receiver. In the preparation according to the formula of the London College, the spirit is also considerably diluted. The water of ammonia, however, of the present edition of the London Pharmacopœia, is so strong from the mode of preparing it, that the ammoniacal impregnation is much stronger than before,—the product containing, according to Mr Phillips, three times the quantity of ammonia that it formerly did; and hence it is too pungent and acrid for use, unless the dose be proportionally diminished. There is another circumstance which may render it doubtful, whether the alteration by the Edinburgh and London Colleges is an improvement,—that when the spirit is impregnated with pure ammonia, the ammonia from its volatility is liable to escape, especially when the impregnated spirit is employed to form tinctures, which in the shops are often kept for a long time, and in bottles not perfectly closed. When the ammonia is in the state of sub-carbonate, this inconvenience is in some measure avoided, and the preparation is also less acrid. Mr Phillips has proposed a process for obtaining this impregnation, more economical than the old process, distilling alkohol from the common sub-carbonate of ammonia with the addition of a little water; a portion of carbonic acid appears to be expelled by the heat, and the ammonia retains only so much as to be still soluble in the alkohol. It might be more economical, and afford a product rather more strongly impregnated, to distil the alkohol from the sub-carbonate of ammonia, with the addition of a little water of pure ammonia. If the object be however to obtain alkohol impregnated with pure ammonia, the process of the Edinburgh or London Pharmacopœia is to be employed.

Ammoniated alkohol has the pungent smell, and retains all the powers of ammonia. It is used principally as the menstruum of some vegetables with which ammonia coincides in medicinal operation.

ALKOHOL AMMONIATUM AROMATICUM, *olim Spiritus Ammoniæ Aromaticus.* Aromatic Ammoniated Alkohol. Ed.

Take of Ammoniated Alkohol, eight ounces; Volatile Oil of Rosemary, one drachm and a half; Volatile Oil of Lemons, one drachm. Mix them so as to dissolve the oils.

SPIRITUS AMMONIÆ AROMATICUS. Aromatic Spirit of Ammonia. Lond.

Take of Spirit of Ammonia, two pints; Oil of Lemons, Oil of Cloves, of each two fluidounces. Mix.

SPIRITUS AMMONIÆ AROMATICUS. Aromatic Spirit of Ammonia. Dub.

Take of Spirit of Ammonia, two pints; Oil of Lemons, two drachms; Nutmegs bruised, half an ounce. Digest in a close vessel, for three days, shaking occasionally; then distil a pound and a-half.

By this combination of ammonia with alkohol, and the addition of the aromatic oils, it is rendered more grateful than the water of ammonia. This preparation is therefore frequently used in preference to the other, as a stimulant in languor or faintness, or to relieve flatulence, and sometimes as an antacid. Its dose is from fifteen to thirty drops.

ALKOHOL AMMONIATUM FŒTIDUM, *olim Spiritus Ammoniæ Fœtidus.* Fœtid Ammoniated Alkohol. Ed.

Take of Ammoniated Alkohol, eight ounces; Assafœtida, half an ounce. Let them digest in a close vessel for twelve hours; then distil eight ounces by the heat of boiling water.

SPIRITUS AMMONIÆ FŒTIDUS. Fœtid Spirit of Ammonia. Lond.

Take of Spirit of Ammonia, two pints: Assafœtida, two ounces. Macerate for twelve hours; then distil a pint and a-half with a gentle heat, into a receiver kept close.

Spiritus ammoniæ fœtidus. Fœtid Spirit of Ammonia. Dub.

Take of Spirit of Ammonia, two pints; Assafœtida, an ounce and a quarter. Digest in a close vessel for three days, agitating occasionally; then pour off the pure liquor, and distil a pint and a-half.

The impregnation of the ammoniated alkohol with part of the assafœtida in this process, though it may communicate a fœtid smell, can add little to its activity; and accordingly, though it has a place in all the Pharmacopœias, it is not found in the shops. It has been given in hysteria in a dose of thirty drops.

Spiritus ammoniæ succinatus. *Lond.* Succinated Spirit of Ammonia.

Take of Mastich, three drachms; Alkohol, nine fluidrachms; Oil of Lavender, fourteen minims; Oil of Amber, four minims; Water of Ammonia, ten fluidounces. Macerate the mastich in the alkohol, so that it may be dissolved, and pour off the clear solution; add to this the other ingredients, and mix them all by agitation.

Spirit of ammonia, impregnated with oil of amber and some other essential oils, has been in use as a stimulating perfume under the name of Eau de Luce. A composition had been introduced into the London Pharmacopœia as a substitute for this, which had not, however, its usual milky appearance. This is given in the present formula by the addition of the mastich, the resinous matter of which is separated by the water, but retained in a state of suspension, probably by the action of the alkali.

AQUA ACETITIS AMMONIÆ, *vulgo Spiritus Mindereri.* Water of Acetate of Ammonia. Ed.

Take of Carbonate of Ammonia, any quantity. Pour upon it as much distilled acetous acid, as may be sufficient to saturate the ammonia exactly.

LIQUOR AMMONIÆ ACETATIS. Liquor of Acetate of Ammonia. Lond.

Take of Carbonate of Ammonia, two ounces; of Distilled Vinegar, four pints. Add the Acid to the Carbonate of Ammonia, until effervescence is no longer excited, and mix them.

AQUA ACETATIS AMMONIÆ. Water of Acetate of Ammonia. Dub.

Take of Carbonate of Ammonia, two ounces; add gradually, agitating occasionally, of Distilled Acetic Acid, three pounds and a-half, or as much as may be necessary to saturate the ammonia; ascertaining this by the test of litmus.

The acetic acid of the distilled vinegar combines with the ammonia of the carbonate of ammonia, disengaging the carbonic acid with effervescence; and the acetate of ammonia being a very soluble salt, remains dissolved in the water. As the distilled vinegar is not uniform in strength, the precise proportion necessary to be added cannot be assigned, but in general it will be about thirty parts to one. As much must always be added as to produce neutralization; and as the liquid is sometimes used as an external application in cases where the acrimony of the alkali would be hurtful, it is better that there should be even a slight excess of acid. From the variable quantity of acid in the vinegar, the preparation cannot be of uniform strength, and this cannot be obviated by crystallizing the salt, the heat decomposing it which would be necessary to evaporate the water. Were it of any importance, a uniformity of strength might be obtained by ordering the quantity prepared from a given weight of carbonate of ammonia to be reduced by slow evaporation to a certain measure; but this is not necessary, the solution having no great activity, and being given generally in divided doses. It is employed as a diaphoretic in febrile affections, an ounce of it being given, and repeated twice or thrice at intervals of an hour, and its operation promoted by mild diluents. Externally it is sometimes used as a discutient, and as an application in some forms of inflammation.

HYDRO-SULPHURETUM AMMONIÆ. Hydro-Sulphuret of Ammonia. Ed.

Take of Water of Ammonia, four ounces. Expose it in a chemical apparatus to the stream of gas which arises from Sulphuret of Iron, four ounces; Muriatic Acid, eight ounces, previously diluted with two pounds and a half of water. The sulphuret of iron for this purpose is conveniently prepared from three parts of Purified Iron-filings, and one part of Sublimed Sulphur, mixed together, and exposed in a covered crucible, to a moderate heat, until they unite.

HYDRO-SULPHURETUM AMMONIÆ. Hydro-Sulphuret of Ammonia. Dub.

Take of Sulphuret of Iron (prepared by exposing three parts of iron-filings, and one of sulphur, to heat in a covered crucible, until they unite,) in coarse powder, four ounces; Muriatic Acid, seven ounces by measure; Water, two pints; Water of Caustic Ammonia, four ounces. Put the sulphuret into a matrass, then add gradually the acid previously diluted with the water, and transmit the gas disengaged, by an apparatus properly adapted through the water of ammonia. Towards the end of the process, apply to the matrass a moderate heat.

The sulphuretted hydrogen is produced in this process by the muriatic acid enabling the iron to decompose part of the water by attracting its oxygen. The hydrogen disgaged combines with a portion of the sulphur, and forms sulphuretted hydrogen; and this elastic fluid being transmitted through the water of ammonia unites with it, and forms a liquid of a dark green colour, and a very fœtid odour.

The medicinal applications of hydro-sulphuret of ammonia have been already taken notice of. It depresses the action of the stomach and digestive organs, and has been used from this quality in bulimia and in diabetes, in a dose of from five to ten drops twice a-day.

AQUA SULPHURETI AMMONIÆ. Water of Sulphuret of Ammonia. Dub.

Take of recently prepared Lime, Muriate of Ammonia in powder, each four ounces; of Sublimed Sulphur, Warm Water, each two ounces. On the lime in an earthen vessel sprinkle the water, and cover the vessel until the lime fall to powder. Mix the powder, when cold, by trituration with the sulphur and muriate of ammonia, avoiding the vapours: Put the mixture into a retort, and distil with a heat suddenly raised, and sufficiently strong. Keep the liquor thus obtained in a phial closely stopt with a glass stopper.

This preparation is similar to one long known to chemists by the name of Fuming Liquor of Boyle, and which Berthollet considered as a hydro-sulphuret of ammonia much concentrated, with an excess of ammonia, to which he ascribed its fuming property. As muriatic acid, when added to it, causes not only a disengagement of sulphuretted hydrogen, but likewise a precipitation of sulphur, it is probably rather a sulphuretted hydro-sulphuret. It has not been applied to any medicinal use.

SULPHAS ALUMINÆ EXSICCATUS, *olim Alumen Ustum.* Dried Alum. Ed.

Let Alum be liquefied in an earthen or iron vessel, and exposed to heat until it cease to boil.

**ALUMEN EXSICCATUM.** Dried Alum. Lond.

Melt Alum in an earthen vessel on the fire; then let the heat be increased, until ebullition cease.

**ALUMEN USTUM.** Burnt Alum. Dub.

Take of Alum, any quantity. Expose it to a strong heat in an earthen vessel, until it cease to boil.

In this process, the alum loses its water of crystallization; it is deprived of its hardness, and resolved into a spongy mass, easily reducible to a fine powder; and both from this, and from being rendered more active, it is better adapted to the purposes of an escharotic, to which it is applied.

**LIQUOR ALUMINIS COMPOSITUS.** Compound Solution of Alum. Lond.

Take of Alum, Sulphate of Zinc, each half an ounce; Boiling Water, two pints. Dissolve the alum and the sulphate of zinc in water; then strain through paper.

This forms a strong astringent solution, which has been employed to check hæmorrhage or profuse mucous discharges; and when considerably diluted, has been used as a collyrium.

**MURIAS BARYTÆ.** Muriate of Barytes. Ed.

Take of Carbonate of Barytes, Muriatic Acid, each, one part; Water, three parts. To the water and acid mixed together, add the carbonate, bruised into small pieces. The effervescence being finished, digest for an hour, then strain, and after due evaporation put the liquor aside that crystals may form. Repeat the evaporation as long as there is any formation of crystals.

If the carbonate of barytes cannot be procured, the muriate may be prepared from the sulphate, in the following manner:

Take of Sulphate of Barytes, two pounds; Wood Charcoal in powder, four ounces. Calcine the sulphate, that it may be the more easily reduced to a fine powder, with which is to be mixed the powder of charcoal. Put this into a crucible, and having adapted a cover, urge it with a strong fire for six hours. The matter being well triturated, put it into six pounds of Boiling Water, in a closed glass or earthen vessel, and mix them by agitation, preventing, as much as possible, the access of the air. Let the vessel stand in a vapour bath, until the part not dissolved has subsided; then pour off the liquor. Pour on the residuum four pounds of boiling water, which, after agitation and subsidence, add to the former liquor. While it is yet hot, or, if it has cooled, having again heated it, drop into it Muriatic Acid as long as effervescence is excited. Then strain it, and evaporate, that it may crystallize.

The first of these processes is the most easy of execution, the muriatic acid combining readily with the barytes, and disengaging the carbonic acid; the muriate of barytes remains dissolved, and by evaporation is obtained crystallized. But the native carbonate of barytes not being an abundant mineral production, is not always to be procured: the second process, therefore, is inserted, in which the sulphate, which is a more common fossil, is substituted. In this process, the carbonaceous matter with which the sulphate is heated attracts the oxygen of the sulphuric acid; the sulphur remains united with the barytes. This sulphuret of barytes is dissolved by the water, and freed from any undecomposed sulphate; but in dissolving, it is at the same time, like other sulphurets with an alkaline or earthy base, partially changed; a portion of its sulphur attracts oxygen from the water, reproducing sulphuric acid, with which a little barytes unites and is precipitated; the hydrogen of the decomposed water unites with another portion of sulphur, forming sulphuretted hydrogen, which enters into combination with the remaining sulphuret of barytes, and prevents its farther decomposition, forming what may be named a sulphuretted hydro-sulphuret. When the muriatic acid is dropt in, it combines with the barytes, disengages the sulphuretted hydrogen, and precipitates the sulphur. The solution of muriate of barytes, on evaporation, affords the salt crystallized. This process, though a little complicated, is perhaps preferable to any other, as it must afford the barytic salt free from any metallic impregnation; for, if any metallic matter be mixed with the sulphate, being reduced by the charcoal, it will not be dissolved in any subsequent step of the process.

Muriate of barytes crystallizes in quadrangular tables: its crystals are soluble in five parts of cold and three of hot water: they are also soluble in alkohol. They consist of 64 of barytes, 21 of acid, and 15 of water. The taste of the salt is harsh and styptic: it proves poisonous to animals, and has been employed medicinally, as has been already stated, principally as a remedy in scrofula.

SOLUTIO MURIATIS BARYTÆ. Solution of Muriate of Barytes. Ed.

Take of Muriate of Barytes, one part; Distilled Water, three parts. Dissolve.

This saturated solution is designed to afford a preparation of uniform strength,—a circumstance of importance, as from the activity of the medicine its dose requires to be regulated with some care. Five drops are given twice a-day, and gradually increased to twenty or more.

CARBONAS CALCIS PRÆPARATUS, *olim Creta Præparata et Cancrorum Lapilli, vulgo Oculi Cancrorum Præparati.* Prepared Carbonate of Lime, formerly Prepared Chalk, and Prepared Crabs Stones, commonly called Crabs Eyes. Ed.

Carbonate of Lime, whether the softer variety, commonly named Chalk, or the harder, called Crabs Stones and Crabs Eyes, after being rubbed to powder in an iron mortar, and levigated with a little water on a porphyry stone, is to be put into a large vessel. Water is to be poured upon it, and after the vessel has been frequently agitated, it is to be poured off, loaded with the fine powder. On the water remaining at rest, a subtle powder subsides, which is to be dried. The coarse powder which the water could not suspend, is to be again levigated, and treated in the same manner.

CRETA PRÆPARATA. Prepared Chalk. Lond.

Take of Chalk, a pound. Add a little water to the chalk, and rub, so as to form a fine powder. Put this into a large vessel filled with water; then shake it, and, after a short time pour off the water while still turbid into another vessel, and put it aside, that the powder may subside. Lastly, having poured off the water, dry the powder,

Prepared Shells (TESTÆ PRÆPARATÆ) are prepared in the same manner, being previously freed from impurities by washing with boiling water.

CRETA PRÆPARATA. Prepared Chalk. Dub.

Rub Chalk to powder in an earthen mortar, adding a little Water. Mix it with a sufficiently large quantity of water by agitation; after a short time, when the coarser particles have subsided, pour off the liquor. This may be done frequently repeating the trituration. Lastly, collect the very fine powder which after some time subsides from the liquor poured off, and dry it on a bibulous stone or paper.

Prepared Oyster Shells (OSTREARUM TESTÆ PRÆPARATÆ) and Prepared Egg Shells (OVORUM TESTÆ PRÆPARATÆ) are prepared in the same manner.

Chalk is a native carbonate of lime, seldom perfectly pure, but containing often portions of argillaceous and siliceous earths. The crabs stones are concretions found in the stomach of the river craw-fish, (Cancer Astacus). They are collected when the animal is in a putrid state, are washed and dried. They have the advantage of being free from any gritty particles, and form therefore a smoother powder. They consist of carbonate and phosphate of lime, with a portion of gelatin; the proportion of carbonate being about seventy, of phosphate ten or twelve. Shells are of similar composition; but for all these, there is generally substituted in the shops chalk prepared with more care, and having a little gelatin diffused through it. They are used as antacids.

CRETA PRÆCIPITATA. Precipitated Chalk. Dub.

Take of Solution of Muriate of Lime, any quantity. Add to it, of Carbonate of Soda, dissolved in four times its weight of warm distilled water, as much as may be sufficient to precipitate the chalk. Render the precipitate pure, by allowing it to subside three times, and washing it each time with a sufficient quantity of water. Then collect it, and dry it on a chalk stone or bibulous paper.

In this process, the muriate of lime is decomposed by double affinity, the muriatic acid being attracted by the soda, and the carbonic acid combining with the lime. It affords a pure carbonate of lime, but is scarcely of sufficient importance to be received as an officinal preparation.

POTIO CARBONATIS CALCIS, *olim Potio Cretacea.* Potion of Carbonate of Lime. Ed.

Take of Prepared Carbonate of Lime, an ounce; Refined Sugar, half an ounce; Mucilage of Gum Arabic, two ounces. Rub them together, and then add gradually, Water, two pounds and a half; Spirit of Cinnamon, two ounces. Mix them.

MISTURA CRETÆ. Chalk Mixture. Lond.

Take of Prepared Chalk, half an ounce, Refined Sugar, three drachms; Gum Arabic in powder, half an ounce; Water, a pint. Mix them.

MISTURA CRETÆ. Chalk Mixture. Dub.

Take of Prepared Chalk, half an ounce; Refined Sugar, three drachms, Gum Arabic in powder, an ounce; Water, a pint. Mix by rubbing them together.

The chalk is in these mixtures suspended by the mucilage; they afford a form in which it is given as an antacid, but it may be doubted whether the mucilage and sugar will not rather be injurious in that state of the stomach which generates acidity. The dose is one or two ounces.

CALX. Lime. Lond.

Take of Limestone, a pound. Bruise it into small pieces, and calcine these in a crucible with a very strong fire for an hour, or until the carbonic acid is entirely expelled, so that acetic acid, when added, shall not disengage any bubbles of air. In the same manner, lime may be prepared from shells, after these have been washed in hot water, and freed from their impurities.

There is little advantage in the introduction of this process; lime prepared on the large scale, for the numerous uses to which it is applied, being sufficiently pure for any medicinal purpose, especially as, when it is internally administered, it must be given in solution; and in the state in which it is usually met with, it impregnates water just as strongly as lime in its purest state.

AQUA CALCIS. Ed.

Take of Lime recently prepared, half a pound: Put it into an earthen vessel, and sprinkle upon it four ounces of water, keeping the vessel closed while the lime becomes hot, and falls into powder; then pour on it twelve pounds of water, and mix them by agitation. After the lime has subsided, repeat the agitation; and do so about ten times, keeping the vessel always shut, that the free access of the air may be prevented. Let the water be strained through paper, interposing between the filter and the funnel glass rods, that the water may pass through as quickly as possible. Let it be kept in bottles well stopt.

LIQUOR CALCIS. Liquor of Lime. Lond.

Take of Lime, half a pound; of Distilled Boiling Water, twelve pints. Pour the water upon the lime, and shake them together, then immediately cover the vessel, and put it aside for three hours; afterwards keep the liquor with the remaining lime, in glass vessels closed, and when it is to be used pour off the clear liquor.

AQUA CALCIS. Lime Water. Dub.

Take of recently calcined Lime, a pound; Boiling Water, a pint. Put the lime into an earthen vessel, and sprinkle the water upon it, closing the vessel while the lime becomes hot and falls into powder, then pour upon it three gallons of cold water. The vessel being again closed, agitate the mixture frequently during twenty-four hours; lastly, strain the liquor through paper placed in a covered funnel, and keep it in vessels well stopt.

Lime is sparingly soluble in water; not more than $\frac{1}{600}$th being dissolved, at 60°. Yet, notwithstanding this small quantity, the water has a strong styptic taste, and changes the vegetable colours to a green. The caution to exclude the air in this process, arises from the supposition that the lime would combine rapidly with the carbonic acid of the atmosphere. After the solution is strained, it is at least necessary that it should be kept in vessels well stopt, and the direction of the London College is perhaps preferable, to keep it in contact with the lime, pouring it off when required for use. Lime water is the form under which lime is always used internally. It is employed as a tonic, astringent, and antacid in dyspepsia, chronic diarrhœa, and leucorrhœa. Its dose is from one to two pounds daily.

AQUA CALCIS COMPOSITA. Compound Lime Water. Dub.

Take of Guaiac Wood in shavings, half a pound; Liquorice Root cut and bruised, an ounce; Bark of Sassafras bruised, half an ounce; Coriander Seeds, three drachms; Lime Water, six pints. Macerate them without heat for two days, and strain.

The lime water can derive very little additional power from these ingredients, and they, on the other hand, must have their powers very imperfectly extracted. The preparation is one, therefore, which can have little activity.

SOLUTIO MURIATIS CALCIS. Solution of Muriate of Lime. Ed.

Take of Pure Carbonate of Lime (namely White Marble), in small pieces, nine ounces; Muriatic Acid, sixteen ounces; Water, eight ounces. Mix the acid with the water, and add gradually the pieces of carbonate of lime. The effervescence being finished, digest for an hour. Pour off the liquor, and reduce it by evaporation to dryness. Dissolve the residuum in its weight and a half of water, and strain.

AQUA MURIATIS CALCIS. Water of Muriate of Lime. Dub.

Take of Chalk in coarse powder, an ounce; Diluted Muriatic Acid, two ounces. To the acid add gradually the chalk, and the effervescence being finished, strain.

The muriatic acid combines with the lime, and disengages the carbonic acid. To remove any superfluous acid, and obtain a solution of uniform strength, the solid salt is in the first process obtained by evaporation, and is then dissolved in a fixed proportion of water. The solution of muriate of lime has been recommended as a tonic, similar, and not inferior to the muriate of barytes. The dose is from fifteen to twenty grains of the dried salt, or thirty drops of the solution.

CARBONAS MAGNESIÆ, *olim Magnesia Alba*. Carbonate of Magnesia. Ed.

Take of Sulphate of Magnesia, Carbonate of Potash, of each equal weights. Let them be dissolved separately in twice their weight of warm water, and either strained or otherwise freed from impurities. Then mix them, and immediately add eight times their weight of boiling water. Boil the liquor for a short time, stirring it, then allow it to remain at rest, until the heat be diminished a little, and strain it through linen, on which the carbonate of magnesia will remain. Wash it with pure water, until it be perfectly tasteless.

MAGNESIÆ CARBONAS. Carbonate of Magnesia. Lond.

Take of Sulphate of Magnesia, of Sub-Carbonate of Potash, each a pound; of Water, three gallons. Dissolve separately the sub-carbonate of potash in three pints of water, and the sulphate of magnesia in five pints of water, and strain; then add the remaining water to the liquor of the sulphate of magnesia, and boil; add the former liquor to it whilst it boils, constantly stirring with a spatula; afterwards strain through linen; lastly, wash the powder, by frequently pouring on it boiling water, and dry it on bibulous paper by a heat of two hundred degrees.

MAGNESIA. Magnesia. Dub.

Take of Sulphate of Magnesia, Sub-Carbonate of Potash; of each two pounds; Boiling Water, twenty pints. Dissolve the sulphate of magnesia and the sub-carbonate of potash, each in ten pounds of water. Mix the clear liquors, boil the mixture a little, and strain it while warm, through linen stretched, so as to collect the magnesia. Wash out the sulphate of potash, by frequently pouring on boiling water; lastly, dry the magnesia.

In this process there is a mutual decomposition of the salts, the sulphuric acid of the sulphate of magnesia combining with the potash of the carbonate of potash, and the carbonic acid uniting with the magnesia. The use of adding the boiling water, and boiling the liquor, is, partly to dissolve the sulphate of potash, which is a salt sparingly soluble, and partly to prevent a species of crystallization which the carbonate of magnesia would undergo, rendering it gritty, and thus give it a smoothness which it has not when this precaution is not observed. Carbonate of magnesia, however, is generally prepared on a large scale from the Bittern, or liquor remaining after the crystallization of muriate of soda from sea-water, which is principally a solution of muriate of magnesia. This is decomposed by carbonate of potash, or sometimes by an ammoniacal carbonate, and there are some niceties of manipulation requisite to give it the whiteness, lightness, and smoothness, which are valued as marks of its goodness. Hence it is superior in these qualities to what it would be were it prepared by the above process on a small scale. In the process of the Pharmacopœias, more of the alkaline carbonate is employed than is strictly necessary; three parts of it, according to Mr Phillips, decompose four parts of the sulphate of magnesia.

This substance, properly prepared, is nearly insipid; it is extremely light, white, and smooth to the touch; is insoluble in water. It consists of from 45 to 55 of magnesia, from 25 to 48 of carbonic acid, and from 15 to 30 of water. What appears to be the neutral carbonate, obtained in crystals by mixing the saline solutions without applying heat, consists of 25 of magnesia, 50 of acid, and 25 of water. The common preparation is therefore a sub-carbonate. The popular name of Magnesia, though incorrect as applied to it, is retained by the Dublin College. It is given as an antacid in a dose from a scruple to a drachm, and usually produces at the same time a laxative effect.

MAGNESIA, *olim Magnesia Usta.* Magnesia. Ed.

Let Carbonate of Magnesia be exposed in a crucible to a red heat, for two hours. Then preserve it in glass phials well stopt.

MAGNESIA. Magnesia. Lond.

Take of Carbonate of Magnesia, four ounces. Calcine it with a very violent heat for two hours, or until acetic acid dropt upon it does not excite effervescence.

MAGNESIA USTA. Calcined Magnesia. Dub.

Take of Magnesia any quantity. Put it into a crucible, and submit it to a strong heat for two hours. Keep the magnesia, when cold, in a glass vessel.

By the heat applied, the carbonic acid of the carbonate, and a considerable portion of its water, are expelled, and the pure magnesia remains. It loses about half its weight. A smaller quantity, therefore, of the pure magnesia, will produce the same effect as a larger of the carbonate. It is preferred to the latter, both from this circumstance, and also, where, from the abundant acidity on the stomach, flatulence is occasioned by the disengagement of carbonic acid when the carbonate is used. The sub-carbonate employed in its preparation requires to have been very carefully washed, for if even a minute quantity of sulphate of potash adheres to it, which is liable to be the case where the washing has not been thoroughly performed, this seems to be decomposed by the heat applied for the calcination, and a very disagreeable sulphureous taste is communicated to the calcined magnesia.

# CHAP. XX.

## METALLICA.—METALLIC PREPARATIONS.

Metals are distinguished by their opacity, brilliancy, and density. They are fusible and volatile at very different degrees of heat; and at various temperatures they combine with oxygen, forming oxides, and, in two or three cases, compounds possessed of acid properties.

The metals used in medicine are, Silver, Quicksilver, Copper, Iron, Lead, Tin, Zinc, Bismuth, Antimony, and Arsenic.

Metals in their pure state being insoluble in the animal fluids, can scarcely exert any action on the system. Tin, by a mechanical action, is supposed to have an anthelmintic power: some of the others, as iron, copper, and lead, have been supposed to be capable of being acted on by the gastric fluids, so as to produce certain effects; but in general they must be combined with other agents to render their action powerful and certain; and it is their preparations only that are used in medicine.

The general changes which metals are made to undergo, to fit them for medicinal purposes, are, combining them with oxygen, and farther, combining the oxides thus formed with acids. In general it is true, that the metal is more active as a medicine, the more highly it is oxidated, though to this there are some exceptions; and its activity is still farther increased by combination with an acid. In general also, where the metal is combined with an acid, it is more certain in its operation than where it is merely oxidated, as its action is independent of the state of the stomach with respect to acidity, which influences the activity of the oxide; and, besides, uniformity of composition is in general more easily attained in the saline compound than in the oxide alone, and from its solubility, its state of aggregation has usually less influence on its action.

The metallic preparations form some of our most important remedies. They are those most liable to uncertainty in their operation, from variations in the processes to which they are subjected: they are at the same time those which, from their activity, it is necessary to have least variable in strength. The principles, therefore, which regulate their combinations, so far as these are connected with their pharmaceutic preparation, are highly important; and require some illustration, before proceeding to the individual preparations.

The simplest form of combination in which metals are administered, is in the state of oxide. Their oxidation is generally effected by the action of atmospheric air, assisted by heat, sometimes by deflagration with nitre, and sometimes also by acids, the acid being afterwards abstracted by the action of a substance exerting an affinity to it. The first mode always gives the oxide in its purest form; in the second mode, a portion of the alkali of the nitre often combines with the oxide; in the third, a portion of acid often adheres to it.

The principal objection to this form of preparation is the uncertainty to which it is liable in the uniformity of its composition. Every metal, in exerting an affinity to oxygen, is capable of combining with that principle in different proportions; and its power of acting on the living system in common with all its qualities, is much influenced by the quantity with which it is combined. The degrees of oxidation of which a metal is susceptible, if not indefinite, as some facts appear to prove, are at least numerous, and they are liable to be varied by slight diversities of circumstances in the operation by which they are formed. Hence the uncertainty to which such preparations are liable.

The only case in which oxides of uniform and determinate composition can be expected to be obtained, are where they are formed under circumstances which establish a perfect uniformity in the process. Thus, if a metal be oxidated by the atmospheric air, exactly at the point at which it melts, as that point is uniform, or always the same, the oxide will likewise be uniform; and for the same reason, if an oxide is formed at the vaporific point, it will be always of the same composition. But where such a uniformity of external circumstances does not exist, the degree of oxidation may be variable. The state of aggregation too, which is not less dependent on external circumstances, gives rise to a considerable diversity in the action of metallic oxides.

These considerations ought to establish a rule in Pharmacy, which has unquestionably been too much neglected, that when a process for the preparation of any metallic oxide has once been established, and practitioners have become accustomed to its powers and strength, the process ought not to be varied or changed, from the idea of some trivial improvement; as an alteration of circumstances, apparently of little importance, may give rise to a very important change in the result. And it is nearly demonstrable, that the oxides of a metal formed by different processes, as, for example, by a process conducted in the humid way, or by one with the application of heat, cannot be precisely the same.

The other form of preparation under which metals are administered, is that in which the metallic oxide is combined with an acid. Compounds of this kind are generally more active than those in which the metal is merely oxidated. The acid perhaps imparts an additional activity, and the compound being generally more or less soluble, must act more powerfully on the stomach, and be more readily received into the circulating mass, than the oxides which are usually insoluble.

These combinations are generally formed by subjecting the metal to the action of the acid. The acid first yields to it oxygen, either directly, by parting with a portion of what it contains, or by a resulting affinity, enabling it to attract oxygen from the water which may be present, or from the atmospheric air. With the oxide formed in either of these modes, the acid combines.

As a metal can exist in different degrees of oxidation, so it may enter into combination with acids with different proportions of oxygen, and, from this circumstance, very important differences in their medicinal powers are established. No preparations can differ more widely than the corrosive muriate, or corrosive sublimate, as it is named, of mercury, and the mild muriate or calomel. Yet the primary difference between them is in the degree of oxidation of the metal, the proportion of oxygen being less in the latter than in the former.

In general, when a metal is acted on by a weak acid, or one much diluted, it forms a compound, in which it is less oxidated than when it has been subjected to the action of a more powerful or concentrated acid. Or if heat has been employed to favour the mutual action, the metal passes to a higher state of oxidation than when it has been dissolved in the cold. It even sometimes happens, that after a metal has been oxidated and combined with an acid, it continues to attract oxygen, either from the acid, or from the atmospheric air,—a circumstance which may give rise to alterations in metallic preparations.

It has been stated, that a metal combines with oxygen in numerous, if not in altogether indefinite proportions. It is an important question in Pharmacy, whether this is the case also when they combine with acids; or do they enter into such combinations only in a few determinate degrees of oxidation? According as one or other of these happens, either uniformity of composition, or much uncertainty may be expected to be found in saline metallic preparations; and if the latter be the case, much more attention will be required, than might be supposed necessary, in establishing a strict uniformity in the processes by which they are formed.

In general, it appears, that the acid, by the energy of the affinity it exerts, has a very powerful effect in rendering the degree of oxidation determinate, and that these combinations are, therefore, usually established in a few uniform proportions. We have an example of this in the two muriates of mercury. In each of these the metal is in a certain state of oxidation, and whatever process be followed, no intermediate combination appears to be formed. At the same time, it must be admitted, that the degree of oxidation of the metallic oxide, in combining with the metal, is often less definite. Thus, in crystallizing a solution of iron in dilute sulphuric acid, the crystals which are first formed are of a pale green colour; those formed by a second or third evaporation are deeper, and there remains a liquid incapable of crystallizing. In all these there are different states of oxidation. In like manner, in the solution of mercury in nitric acid, the acid may exist in a number of degrees of oxidation, according to the manner in which the solution has been performed, and these solutions will give rise to very different compounds in the decompositions and new combinations to which they may be subjected.

Another source of uncertainty in the composition of the metallic salts, is, that the metallic oxide can combine with various and apparently indefinite proportions of acid. We can have the compound with the acid and metallic oxide combined in those proportions which give rise to neutralization, but we can have it also with various degrees of excess of acid, or excess of base; and each of these will give a preparation different in power, and liable to be very differently affected by other chemical agents.

This is in particular often displayed in preparing metallic compounds by the medium of acids. From the uncertainty to which the oxidation of metals, by the application of heat, is liable, it has frequently been proposed to obtain the product in the humid way, the metal being dissolved in an acid, and this acid being abstracted afterwards by a substance exerting an affinity to it, and the metal precipitated in its oxidated state. But in almost every case these precipitates are not pure oxides, as they have been supposed to be: they retain a portion of the acid with which the oxide was combined, and are therefore sub-salts. They are sometimes thrown down merely by water, and they then retain a considerable proportion of acid in combination; and even when subjected to the more powerful action of an alkali, the whole of the acid is not abstracted, the influence of quantity adding so much to the force of affinity, that a portion of it is retained by the oxide.

In these precipitations from the decomposition of metallic salts, the composition of the precipitate is frequently rendered still more complicated, from part of the precipitating substance entering into the combination.

The influence of the proportions in which a metallic oxide and acid may combine, is shewn in another case,—that where, by applying heat, the acid may have its solvent power so far aided, and be from this cause so saturated with the oxide, as to be incapable of retaining the whole of it in solution when diluted. When water is added, therefore, to a solution of this kind, a partial decomposition ensues; part of the metallic oxide is precipitated, retaining a portion of acid united with it, forming a sub-salt, while the other portion remains dissolved with a slight excess of acid. Now, if such a solution is to be decomposed by adding a neutral salt with the acid of which the metallic oxide is designed to be combined, the mere water in which the salt is dissolved will at the same time act on the metallic solution, and throw down a quantity of this precipitate, which will mingle with the precipitate formed by the metallic oxide and the acid of the decomposing salt, and will of course modify its powers. Hence, a metallic solution is liable to afford, when decomposed, very different products, both from the different states of oxidation in which it may hold the metal dissolved, and the different proportions of oxide with which the acid may be combined.

Metallic preparations, it is thus obvious, are liable to uncertainty of composition; and this suggests the conclusion, that processes with regard to them, once established, ought not to be hastily altered, even in circumstances apparently trivial. It is equally obvious how important it is, that for every active metallic preparation, the same process should be adopted in every country.

The nomenclature of the metallic saline preparations is attended with considerable difficulty, especially in discriminating between the different salts formed from the same acid, united with the same metal, but existing in different states of oxidation. This difference gives rise to very different medicinal properties, or at least very different degrees of activity, and renders it necessary, therefore, that the names ought to be so far distinct, that the one salt cannot be mistaken for the other. Now, the chemical nomenclature is, with regard to this case, defective, and it is difficult to render it more precise. The system of nomenclature requires that the name of each compound salt should be derived from the acid and the base of which it is composed, the acid affording the radical of the generic name, the base giving the specific appellation. But the names of the species of metallic salts have been derived, not from the metallic oxide which is strictly their base or the substance in direct combination with the acid, but from the metal itself. We thus speak of sulphate of iron, muriate of mercury, and others, though the substances to which these names are applied, are rather sulphate of oxide of iron, muriate of oxide of mercury, &c. Did the metal exist always in one state of oxidation as it is combined with the acid, this nomenclature would give rise to no inconvenience. But as it is often in different states of oxidation, the nomenclature is deficient, or something more is required to distinguish between the different salts which, from these different states of oxidation, may be formed from the same metal and the same acid.

In general, not more than two salts are formed from diversity of oxidation in the same metal combined with the same acid; and one method which has been employed to mark their distinction, is to apply the usual generic name to the salt formed from the metal in the low state of oxidation, and to prefix to the same generic name applied to the other salt, the syllable *oxy*, as denoting the higher degree of oxidation. Thus there are two muriates of mercury, one containing the metal at a low, the other at a high degree of oxidation, and these, according to this method, would be distinguished, the one by the name of Muriate, the other by that of Oxymuriate of Mercury. But, independent of the objection, that this violates the principles on which the nomenclature is constructed, since the one salt is just as much a muriate as the other; the syllable *oxy* is appropriated, in the language of Modern Chemistry, to denote the compounds of an oxygenated acid; and Oxymuriate of Mercury, a name now sanctioned by the London College, expresses therefore, not a compound of muriatic acid, but a compound of oxymuriatic acid. Besides, as a medical nomenclature, the merely prefixing the syllable to the same term is far from being sufficient to distinguish between salts totally different, and which it is in the highest degree dangerous to confound. Another method employed, is to apply the generic term to the salt formed from the oxide at the maximum of oxidation; and to prefix to the same term applied to the salt at the minimum, the syllable *sub*; naming, for example, one of the salts of mercury now referred to, Muriate of Mercury, the other Submuriate of Mercury. This has been adopted by the Edinburgh College; but it is equally incorrect. The principles on which the modern nomenclature is founded, require that the epithet *sub* should be appropriated to the names of those salts in which there is a deficiency of acid or excess of base; the base still being the same as that of the corresponding salt, to the name of which this epithet is not prefixed. But in the metallic salts to which this mode has been applied, there is no deficiency of acid, and the base is not the same; the salt to which the epithet *sub* is applied may contain less acid than the other, but this is because the oxide, which is its base, requires less for its saturation: it is altogether a different species, and by the addition of acid, it cannot be converted into the other, which it would be, were it, as the name implies, a Sub-salt. This mode too is liable to the same objection as the other, the merely prefixing to the name common to both, the epithet *sub*, to distinguish one of them, not being sufficiently distinctive, where it is of so much importance that they should be distinguished.

Any nomenclature founded on the supposition of specific degrees of oxidation being established, would be equally improper; for, even supposing them not to be altogether indefinite, the propriety of the appellation in any case would depend on the perfect accuracy of the analysis, and the discovery of a different degree of oxidation with regard to any metal would require the change of the nomenclature of its salts, and, what is still worse, would cause a name, which had been appropriated to one, to be transferred to another.

The only mode that appears practicable, if names altogether arbitrary are not adopted, is to derive the distinctive appellations of these salts from properties in which they differ. If two salts, formed from the same metal and the same acid, but only in different states of oxidation, differ in colour, as is frequently the case, this affords a ground of discrimination in their names, and it is accordingly sometimes had recourse to. Thus, we speak of the green and the brown sulphate of iron. If the colour be the same in each, which may be the case, then the distinction may be drawn from any other property in which they differ. Thus the two muriates of mercury may be distinguished, the one by the appellation of Corrosive Muriate, the other by that of Mild Muriate. This nomenclature, while it violates no principle, has the advantage, that being founded on the properties of the substances, it is permanent; and as applied to medicinal substances, it has the not less important advantage, that it serves in the more important cases to point out the difference to which it is most essential to attend.

Metals are sometimes employed medicinally, combined with sulphur or with sulphuretted hydrogen. When the sulphur is united with the metal itself, the preparation is generally inactive. When the metal is oxidated, and farther combined, either with sulphur or sulphuretted hydrogen, it is more active; but as the degree of oxidation may be various, and as the affinities exerted by sulphur or sulphuretted hydrogen are not sufficiently energetic to render them definite, these preparations are liable to be variable in strength. Hence few of them are retained.

## ARGENTUM.—SILVER.

NITRAS ARGENTI, *olim Causticum Lunare.* Nitrate of Silver. Ed.

Take of the Purest Silver, extended in plates and cut, four ounces; Diluted Nitrous Acid, eight ounces; Distilled Water, four ounces. Dissolve the silver in a phial with a gentle heat, and evaporate the solution to dryness. The mass being put into a large crucible, let this be placed on the fire, which must be at first gentle, and gradually increased until the matter flow like oil. Then pour it into iron pipes, heated and rubbed with grease. Lastly, keep it in a glass vessel well stopt.

ARGENTI NITRAS. Nitrate of Silver. Lond.

Take of Silver, an ounce; Nitric Acid, a fluidounce and a half; Distilled Water, two fluidounces. Mix the nitric acid with the water, and dissolve the silver in it in a sand-bath, and gradually increase the heat, that the nitrate of silver may be dried. Melt in a crucible, with a gentle heat, until the water being expelled, ebullition ceases, then immediately pour it into proper moulds.

NITRAS ARGENTI. Nitrate of Silver. Dub.

Take of Silver in thin plates and cut, Nitrous Acid, each an ounce; Distilled Water, two ounces. Put the silver into a glass vessel, placed on sand, and pour on it the acid previously diluted with the water. By a heat gradually increased dissolve the metal, and evaporate the liquor to dryness. The residual matter being put into a crucible, melt it with a gentle heat; lastly, pour it into proper moulds, and keep it in a glass vessel well stopt.

The silver in this process is oxidated and dissolved by the nitrous acid. By the subsequent fusion, a considerable part of the acid is expelled, so that the product is rather a sub-nitrate than a nitrate of silver. The metal ought to be free from all alloy of copper, which gives to the preparation a green colour, and renders it more deliquescent; more acid is ordered in the above formulas, especially in that of the London College, than is necessary. The product is a powerful escharotic, and has the advantage of being easily applied, and confined, and of acting quickly. It is therefore the one in general use for the common purposes for which escharotics are employed.

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## ANTIMONIUM.—ANTIMONY.

SULPHURETUM ANTIMONII PRÆPARATUM, *olim Antimonium Præparatum.* Prepared Sulphuret of Antimony. Ed.

Let Sulphuret of Antimony be prepared in the same manner as Carbonate of Lime.

SULPHURETUM ANTIMONII PRÆPARATUM. Prepared Sulphuret of Antimony. Dub.

Reduce to powder, and in the manner prescribed for the preparation of chalk, separate the finest particles which are to be reserved for use.

This preparation is merely levigation, and when the sulphuret of antimony is levigated, it has been supposed to act with more certainty than when given in a coarser powder. It is still, however, very inactive. As a remedy in chronic rheumatism, it has been given in a dose of five or ten grains daily.

OXIDUM ANTIMONII CUM SULPHURE VITRIFICATUM, *olim Vitrum Antimonii.* Vitrified Sulphuretted Oxide of Antimony. Ed.

Strew Sulphuret of Antimony, rubbed to a coarse powder like sand, on a shallow unglazed earthen vessel, and apply to it a gentle fire, that the sulphuret of antimony may be slowly heated; at the same time stirring constantly the powder, that it may not run into lumps. White vapours, smelling of sulphur, will arise from it. When these, while the same degree of heat is kept up, cease, increase the heat a little, that vapours may again exhale; and proceed in this manner, until the powder, raised at length to a red heat, exhales no more vapours. This powder being put into a crucible, is to be melted with a strong fire, until it assume the appearance of fused glass; then pour it upon a heated brass plate.

In the first stage of this process, the greater part of the sulphur of the sulphuret of antimony is dissipated, and the antimony is imperfectly oxidated. In the second, the heat applied being more intense, the sulphur is more completely expelled, the antimony is more highly oxidated, and the oxide is vitrified. According to Thenard's analysis, this oxide contains 16 of oxygen in 100 parts. Proust has farther shewn, that it retains a portion of sulphur combined with it, or, as he states it, a portion of the metallic sulphuret, (about one part in nine of the preparation), and lastly, Vauquelin found, that it always contains siliceous earth, which is discoverable by the gelatinous residuum obtained on evaporation of any saline compound formed from this oxide. The quantity appears to be about 9 or 10 parts in 100; it is derived from the earthy matter of the crucible, and probably promotes the vitrification of the oxide. The product is a perfect glass, being transparent in thin pieces, hard and brittle, of a reddish brown colour. It is extremely harsh, and at the same time uncertain in its operation, and is hence not used but in preparing some of the other antimonials.

OXIDUM ANTIMONII VITRIFICATUM CUM CERA, *olim Vitrum Antimonii Ceratum.* Vitrified Oxide of Antimony with Wax. Ed.

Take of Yellow Wax, one part; Vitrified Oxide of Antimony with sulphur, eight parts. To the wax, melted in an iron vessel, add the oxide rubbed to powder, and roast them with a gentle fire, for a quarter of an hour, stirring constantly with a spatula; then pour out the matter, which, when it is cold, rub to powder.

It is probable, that during this process, the oxide of antimony loses part of its oxygen, from the carbonaceous matter of the wax attracting it, as it diminishes in weight; and it is probable also, that its state of vitrification is changed. It becomes much milder in operation. Though once highly recommended in dysentery, it may be regarded as an obsolete remedy. The dose in which it was given, was from five to fifteen grains, and its principal operation was that of a cathartic, from which probably any benefit received from it was derived.

OXIDUM ANTIMONII CUM PHOSPHATE CALCIS, *olim Pulvis Antimonialis.* Oxide of Antimony with Phosphate of Lime. Ed.

Take of Sulphuret of Antimony, rubbed to a coarse powder, Hartshorn Shavings, of each equal parts. Mix and throw them into a wide iron pot, red hot, and stir them constantly until they are burnt into a matter of a grey colour, which remove from the fire, rub to powder, and put into a coated crucible. Lute to this crucible another inverted, in the bottom of which a small hole is drilled; apply the fire, which is to be gradually raised to a white heat, and kept at this increased heat for two hours. Lastly, triturate the matter, when cold, into a very fine powder.

PULVIS ANTIMONIALIS. Antimonial Powder. Lond.

Take of Sulphuret of Antimony in powder, a pound; Shavings of Horn, two pounds. Mix, and throw them into a broad iron pot at a red heat, stirring constantly, until they become of a grey colour. Removing the matter, rub it to powder, and put it into a coated crucible, with another crucible inverted, in the bottom of which is a small hole, joining them with lute. Then apply heat, and increase it gradually to a white heat for two hours. Rub the residuum, so that it shall form a very fine powder.

PULVIS ANTIMONIALIS. Antimonial Powder. Dub.

Take of Sulphuret of Antimony in coarse powder, Shavings of Hartshorn, of each, two pounds. Boil the hartshorn in a quantity of water sufficient to separate the animal gluten, then dry and mix it with the antimony; throw the mixture into an open iron pot heated to redness, stirring constantly, until the vapours of sulphur cease to exhale, and the matter becomes of a grey colour. Rub the matter when cold into powder, and put it into a coated crucible. Adapt to this another inverted, in the bottom of which is a small hole, and secure the joining with lute. Calcine the matter with a heat gradually raised to a white heat, for two hours; when cold, rub it into a very fine powder.

With regard to these processes, the only variation in that in the Dublin, from that in the Edinburgh Pharmacopœia, is, that the hartshorn is previously boiled to extract from it the gelatin,—a circumstance of little importance, as this gelatin is decomposed by the heat. The London College have changed the strength of the preparation, two parts of shavings of horn being employed to one of sulphuret of antimony. The reasons which have been assigned for this are, that the preparation is brought nearer to the strength of *James's* powder, for which this is designed as a substitute, and that it is rendered more manageable in its administration. With regard to the first, there is some doubt, as with the enlarged proportion of antimony, a preparation different in the proportions of its constituent parts from those of the James's powder, as analysed by Pearson, must be obtained. And though it were just, it was of more importance to preserve an active preparation, now officinal, of the same strength in all the Pharmacopœias, than to assimilate it to the strength of an empirical remedy. With regard to the other, the powder appears to be just as manageable of the one strength as of the other. The product of the process of the London

Pharmacopœia is said to be perfectly white, in which circumstance it resembles James's powder: that prepared with the larger proportion of sulphuret of antimony has always a yellow shade.

This process has been introduced into the Pharmacopœias, as affording a preparation similar to the empirical medicine, *James's Powder*, justly celebrated as a remedy in fever. Nothing more was known with regard to this, than that it was an antimonial, until its analysis was undertaken by Dr Pearson. He found the genuine powder of James to consist of 43 parts of phosphate of lime, and 57 of an oxide of antimony, part of which was vitrified; and by the above formula, he was able to prepare a powder similar to it in qualities and chemical composition. The theory of the process is sufficiently obvious. During the first stage, the animal matter of the bones is decomposed and burnt out; the sulphur of the sulphuret of antimony is expelled, and the metal is imperfectly oxidated. In the second stage of the process, the metal is more completely oxidated, the oxide is partially vitrified, and is perhaps brought into combination with the phosphate of lime, which is the residuum of the bones. This latter supposition remains, however, uncertain. That portion at least of the oxide which is vitrified cannot be combined with the phosphate; the other perhaps may be in this state of combination, as Dr Pearson supposed. Chenevix, from his experiments on the powder, supposed them rather to be merely intimately mixed. He found too, that in the preparation obtained by Pearson's process, more of the oxide of antimony is vitrified than in the genuine James's powder, the proportion in the one being not less than 44 in 100 of the oxide, in the other only 28.

Mr Chenevix proposed a method of obtaining this preparation in the humid way,—taking equal weights of the white powder precipitated by water, from muriate of antimony, and of pure phosphate of lime, obtained by dissolving calcined bone in muriatic acid, and precipitating the phosphate by ammonia; dissolving these in as much muriatic acid as may be necessary, with the assistance of a moderate heat, and pouring this solution into ammonia diluted with distilled water. The ammonia combines with the muriatic acid, and the oxide of antimony and phosphate of lime are thrown down intimately mixed. This preparation may be more uniform in composition than that obtained by heat, as, in the latter, variations are liable to be introduced from the different degrees of oxidation of which antimony is susceptible, and also from the vitrification and volatility of the antimonial oxide; but it cannot be the same compound as the other: it is indeed merely a mixture of sub-muriate of antimony and phosphate of lime. It appeared, from some trials made of it, to be milder in its operation than the other preparation; but it would require more extensive experience, to determine if it has the same medicinal effects.

The medical history of these preparations has been already delivered. James's powder has been celebrated as a remedy in febrile affections. It acts as a general evacuant, occasioning sweat, purging, and frequently vomiting; and, by this general action, appears sometimes to arrest the progress of fever, if given at its commencement, or to produce a more favourable crisis. Its dose is five or six grains, repeated every six hours, till its effects are obtained. It has been affirmed, that the preparation obtained by the process of the Pharmacopœias is not so certain nor so powerful in its operation as the powder of James, eight grains of the former being not more than equal to six of the latter.

The difference, if it exist, may be owing to some peculiarity in the process, by which a difference of oxygenation, or of vitrification of the oxide may be occasioned; and, as has been already stated, it does appear that the proportion of oxide vitrified is not the same in the one as in the other. It remains to be determined, how far the preparation from the proportions, as given now by the London College, differs from the others, or is similar to the James's powder.

SULPHURETUM ANTIMONII PRÆCIPITATUM. Precipitated Sulphuret of Antimony. Ed.

Take of Water of Potash, four pounds; Water, three pounds; Prepared Sulphuret of Antimony, two pounds. Boil them in a covered iron pot, on a gentle fire, for three hours, stirring frequently with an iron spatula, and adding water as it may be necessary. Strain the hot liquor through a double linen cloth, and to this strained liquor, add as much diluted sulphuric acid as may be necessary to precipitate the sulphuret, which is to be carefully washed with warm water.

ANTIMONII SULPHURETUM PRÆCIPITATUM. Precipitated Sulphuret of Antimony. Lond.

Take of Sulphuret of Antimony in powder, two pounds; Liquor of Potash, four pints; Distilled Water, three pints. Mix, and boil with a gentle heat for three hours, stirring constantly, and adding occasionally distilled water, so that it may keep up the same measure. Strain the liquor immediately through a double linen cloth; gradually drop into it, while still warm, diluted sulphuric acid, as much as is sufficient to precipitate the powder; then remove the sulphate of potash, by washing with warm water; dry the precipitated sulphuret of antimony, and rub it to powder.

SULPHUR ANTIMONIATUM FUSCUM. Brown Antimoniated Sulphur. Dub.

Take of Sub-carbonate of Potash, Prepared Sulphuret of

Antimony, each equal parts. Melt them mixed together in a crucible, then reduce the cold matter to powder. Put this into a matrass with four pints of water, and boil for a quarter of an hour; remove the vessel from the fire and close it; allow it to remain at rest for a short time, and as soon as the liquor has become clear, opening the vessel, pour it cautiously from the sediment: the antimoniated sulphur will separate in part, as the liquor cools; add of diluted sulphuric acid as much as may be sufficient to throw it down entirely, which leaves an excess of acid; shake the mixture, that the matter last thrown down (which will be of a yellowish red colour) may be mixed with the rest; then, after due subsidence, pour off the liquor from the sediment, which wash with cold water as long as the decanted liquor appear acid by the test of litmus. Lastly, dry it on bibulous paper.

The only variation of any apparent consequence in these processes is in that of the Dublin Pharmacopœia, in which the sulphuret of antimony and sub-carbonate of potash are fused together, and the matter is lixiviated afterwards with water; the liquor thus obtained, however, appears to be essentially the same with that formed by boiling the water of potash on the sulphuret; and the successive steps being similar, there is no essential difference in the product.

From the analysis of this preparation by Thenard, it appears to be composed of 68.3 of the orange-coloured oxide of antimony, (which consists of 18 of oxygen, and 82 of antimony), 17.8 of sulphuretted hydrogen, and 11 or 12 of sulphur. The theory of its formation is somewhat intricate. In boiling the sulphuret of antimony with the potash, a sulphuret of potash is formed, and this decomposing part of the water, a sulphuretted hydro-sulphuret of potash, that is a compound of potash, sulphur and sulphuretted hydrogen, is also produced; the antimony appears to be at the same time oxidated, probably by the sulphuretted hydrogen acting as a weak acid, and by a disposing affinity enabling it to attract part of the oxygen of the water. This oxide is retained in solution by the sulphuretted hydro-sulphuret of potash. When sulphuric acid is added, it unites with the potash; a little of the sulphuretted hydrogen is disengaged with effervescence, and the antimonial oxide, combined with the remaining sulphuretted hydrogen and with the sulphur, is precipitated. The compound, therefore, is a sulphuretted hydro-sulphuret of oxide of antimony, or a compound of oxide of antimony, sulphur and sulphuretted hydrogen, as stated above. The name given to it in the Pharmacopœias does not at all express its real nature.

When the liquor obtained by boiling the solution of potash on the sulphuret of antimony is strained, and allowed to cool, it deposites a red-coloured powder, which has been known by the name of *Kermes Mineral*, and has been much used on the Continent. From the analysis of it by Thenard, it appears to be a compound of brown oxide of antimony and sulphuretted hydrogen, with a small portion of sulphur; the proportions being 73 of oxide of antimony, 20 of sulphuretted hydrogen, and 4 of sulphur; the last, as Thenard supposes, being accidental. Trommsdorff attributes the difference between these two preparations to the one *essentially* containing sulphur combined with the oxide of antimony and sulphuretted hydrogen; the other not. Thenard ascribes it rather to a difference of oxygenation, the oxide in the *kermes* being less highly oxidated than in the other; but as both can be obtained from the same solution, either as we allow it merely to cool, or as we add sulphuric acid, which cannot change the state of oxidation, this is not probable, while the difference in the proportion of sulphur must, from the nature of the process, necessarily exist; for in the one case, the oxide can be combined only with those portions of sulphur and sulphuretted hydrogen which it can attract, while in the other, the sulphur precipitated by the addition of the acid must be also added to it. The kermes mineral is probably therefore essentially a compound of oxide of antimony and sulphuretted hydrogen, with a small and variable proportion of sulphur. The one preparation, the Kermes Mineral, may be distinguished, though not perfectly correctly, by the name Hydro-Sulphuretum Oxidi Antimonii Rubrum; the other by that of Hydro-Sulphuretum Oxidi Antimonii Luteum. The quantity of both products, from a given weight of sulphuret of antimony, may be considerably increased by adding a portion of sulphur, and increasing the quantity of alkali, the proportion of sulphur in the native sulphuret not being sufficient to render the whole of the metal soluble, and a quantity of it, therefore, without this addition, remaining undissolved.

These preparations agree nearly in their medicinal qualities, which are similar to those of the other antimonials. They have been used principally as diaphoretics and sudorifics, but are always uncertain in their operation, and in this country are scarcely used. The dose of the precipitated sulphuret of antimony, as it is named, is five or six grains, that of the Kermes may be the same.

### OXIDUM ANTIMONII CUM SULPHURE PER NITRATEM POTASSÆ, *olim Crocus Antimonii.* Oxide of Antimony with Sulphur, by Nitrate of Potash. Ed.

Take of Sulphuret of Antimony, Nitrate of Potash, of each the same weight. Triturate them separately, and, having mixed them well together, throw them into a crucible red hot. The deflagration being over, separate the reddish matter from the white crust, and rub it to a powder, which is to be frequently washed with warm water, until it remain insipid.

During the deflagration, the nitric acid of the nitrate of potash is decomposed, and its oxygen is attracted, partly by the sulphur, and partly by the antimony. The sulphurous acid, which is the principal product of the oxygenation of the sulphur, is in part dissipated, and in part combined with the potash; and with a little sulphuric acid likewise produced, forms the white crust which is directed to be removed. By the union of another portion of the oxygen with the antimony, a brown or reddish oxide is formed. It appears also that part of the sulphuret of antimony escapes decomposition or oxygenation, and remains combined with the oxide, in the proportion of about two parts to eight; or rather, perhaps, the oxide retains a little sulphur combined with it. The preparation, therefore, is an imperfect oxide of antimony with sulphur or sulphuret of antimony. It is of a brick red colour: what is to be found in the shops is generally of a grey colour, and is usually prepared very improperly, with a diminished proportion of nitre.

As an antimonial, this preparation is so uncertain in its operation, that it is never prescribed; it is used in making some of the other preparations of this metal.

MURIAS ANTIMONII. Muriate of Antimony. Ed.

Take of Oxide of Antimony with Sulphur by Nitrate of Potash, Sulphuric Acid, of each one pound; Dried Muriate of Soda, two pounds. Pour the Sulphuric Acid into a retort, adding gradually the muriate of soda and the oxide of antimony, previously mixed. Then distil from warm sand. Expose the distilled matter for some days to the air, that it may deliquesce; then pour the liquid part from the impurities.

In this mode of forming muriate of antimony, the muriate of soda is decomposed by the sulphuric acid combining with the soda; the muriatic acid disengaged, unites with the oxide of antimony, and the compound is volatilized. The same product is obtained by the direct action of oxymuriatic acid gas on metallic antimony, the oxygen communicated to the metal forming the oxide with which the muriatic acid combines. According to the hypothesis lately maintained with regard to muriatic acid, the compound is one merely of antimony with oxymuriatic gas or chlorine. It is at first of a soft consistence, whence its old name of Butter of Antimony, and cannot be dissolved by pouring water upon it, the mass of water acting on it, by its quantity, and decomposing it, separating a sub-muriate. But, when left exposed to the air, it slowly imbibes as much water as is sufficient for its solution without decomposition, and then forms a dense heavy liquid of a brown colour. By the addition of water to this, the same decomposition is produced, and sub-muriate of antimony is precipitated.

This preparation is, from its acrimony, unfit for internal use; externally it has sometimes been used as a caustic. Decomposed by potash, it affords an oxide which has been used in preparing the tartrate of antimony.

Muriate of Antimony has not directly a place in the London or Dublin Pharmacopœias, but a process is given for preparing it, with the view of obtaining from it the following antimonial preparation, — probably a sub-muriate, though denominated an oxide.

ANTIMONII OXYDUM. Oxide of Antimony. Lond.

Take of Sulphuret of Antimony in powder, two ounces; Muriatic Acid, eleven fluidounces; Nitric Acid, one fluidounce. To the acids mixed together in a glass vessel, add gradually the antimony, and digest with a boiling heat for an hour; then strain, and pour the strained liquor into a gallon of water, in which two ounces of sub-carbonate of potash have been previously dissolved. Wash the precipitated powder, by pouring water frequently upon it, until no acid remain, then dry it on bibulous paper.

OXYDUM ANTIMONII NITRO-MURIATICUM. Nitro-Muriatic Oxide of Antimony. Dub.

Take of Prepared Sulphuret of Antimony, two ounces; Muriatic Acid by measure, eleven ounces; Nitrous Acid by measure, one drachm. Add the sulphuret gradually to the acids, previously mixed in a glass vessel, avoiding the vapours; then digest with a heat gradually raised until the mixture cease to effervesce; lastly, boil for an hour. Strain the liquor when cold, and receive it strained in a gallon of water; the oxide of antimony is precipitated; wash it with a sufficient quantity of water, until the decanted liquor appear by the test of litmus to be free from acid; lastly, dry the oxide on bibulous paper.

Muriatic acid acts very feebly on antimony, not being capable of communicating to it oxygen directly, and the affinity of the metal to this principle not being sufficiently strong as to be able, even when aided by the resulting affinity of the acid, to decompose water. By the addition of nitric acid, the oxidation and solution are more easily effected, the nitric acid yielding oxygen to the metal, and the oxide combining with the muriatic acid: the sulphur of the sulphuret appears to suffer little change. The strained liquor, therefore, is a muriate of antimony, and this undoubtedly appears a simple method of procuring it. Of the two processes, that given by the Dublin Pharmacopœia was first introduced as an officinal one. The principal objection to it is its being too expensive, from the large quantity of muriatic acid employed, in proportion to the quantity of antimony; a larger quantity of the metal probably might be dissolved, especially with a small increase in the proportion of nitric acid, and the product be increased. The London College in adopting the formula have altered the proportions, so as altogether to defeat the success of the process. The proportion of nitric acid is much more than is necessary to afford oxygen to the antimony; and it renders the action so violent, that the operation can scarcely be conducted, the extrication of offensive vapours being so rapid, and the materials, by the violence of the effervescence, being sometimes even thrown from the vessel. Part of the sulphur too of the sulphuret appears to be acted on, and brought into a state in which it is not easily separated from the oxidated antimony. Lastly, the digesting the liquor at a boiling heat for so long a time, is not only unnecessary, but inconvenient, as rendering the liquor so thick, that it is difficult to strain it. Considered therefore as a process for affording a muriate of antimony, that of the Dublin College is unnecessarily expensive and inconvenient, and that of the London College is altogether defective. It is not less so in relation to the object of the preparation, that of affording an oxide to be employed in the preparation of emetic tartar, as for that purpose it is, as is immediately to be stated, quite unfit.

The subsequent stage of the process, that of the decomposition of the muriate to afford the oxide, is effected, according to the one formula, by the action of a weak solution of sub-carbonate of potash; according to the other, by the addition of water. The precipitate thrown down from muriate of antimony by water used to be regarded as an oxide, but it was long ago shewn by Rouelle to be a sub-muriate; the water, by its affinity to the acid, abstracting the greater portion of it; but the oxide still, in conformity to the law which usually regulates these decompositions, retaining a portion of the acid combined. If the sub-muriate, after being precipitated, is thoroughly washed with water, and then digested with a solution of potash or sub-carbonate of potash, a considerable portion of this acid is abstracted, though probably not the whole of it; for the influence of quantity on the affinity exerted by the oxide to the acid is becoming more powerful as the abstraction proceeds, and will cause part of the acid to be retained. The method of applying the sub-carbonate of potash directed by the London College is designed probably to abstract the acid more effectually from the oxide; but it is of no advantage in this respect, though it may increase a little the quantity of precipitate. By the agency of the water of the solution the muriate is decomposed, and the sub-muriate is thrown down, the liquor above retaining the excess of muriatic acid. This excess of acid the alkali will be spent in neutralizing, and is even insufficient for this: it will thus be prevented from acting on the precipitate, so as to abstract any of the acid it contains, at least unless it were employed in much larger quantity than is ordered by the College. The method of applying with effect the quantity they use, would be to precipitate the muriate with water, remove the acidulous liquor above, wash the precipitate, and then submit it to the agency of the sub-carbonate, by digesting them with a small portion of water. A considerable part of the acid might then be abstracted. But there is some reason to believe, that, for the purpose to which this oxide is designed to be applied, that of preparing emetic tartar, the presence of a little muriatic acid, instead of being detrimental, is useful.

This preparation is not designed for internal administration, but for the preparation of other antimonials, particularly that of the tartrate of antimony and potash. Its application to this is to be immediately noticed.

TARTRIS ANTIMONII, *olim Tartarus Emeticus.* Tartrite of Antimony, formerly Emetic Tartar. Ed.

Take of Oxide of Antimony with Sulphur by Nitrate of Potash, three parts; Super-Tartrate of Potash, four parts; Distilled Water, thirty-two parts. Boil them in a glass vessel for a quarter of an hour. Strain through paper, and put aside the strained liquor that crystals may form.

ANTIMONIUM TARTARIZATUM. Tartarized Antimony. Lond.

Take of Oxide of Antimony, two ounces; Super-Tartrate of Potash in powder, three ounces; Distilled Water, eighteen fluidounces. To the water boiling in a glass vessel throw in gradually the antimony and super-tartrate of potash mixed together, and boil for half an hour; then strain the liquor through paper, and boil it down with a gentle heat in a glass vessel, so that while it cools slowly, crystals shall form.

TARTARUM ANTIMONIATUM, *sive Emeticum.* Antimoniated or Emetic Tartar. Dub.

Take of Nitro-Muriatic Oxide of Antimony, two ounces; Crystals of Tartar in very fine powder, two ounces and a half; Distilled Water, eighteen ounces. Cause the water to boil in a glass vessel, then throw into it gradually the oxide and tartar previously mixed together, and boil for half an hour; strain the liquor through paper, and let it cool slowly that crystals may form.

The excess of tartaric acid in the super-tartrate of potash is capable of combining with a number of metallic oxides, and of forming ternary compounds. With oxide of antimony, when not too highly oxidated, it unites with facility, forming a combination of this kind, which constitutes the present preparation, the tartaric acid of the super-tartrate, dissolving a portion of the oxide of antimony, and a triple compound of oxide, acid and potash crystallizing; it is not therefore a pure tartrate of antimony, but a tartrate of antimony and potash, and the name given to it in all the

Pharmacopœias is chemically incorrect, and is so without any necessity or advantage. Tartras Antimonii et Potassæ is its proper appellation. According to the analysis of it by Thenard, it consists of 38 parts of oxide of antimony, 34 of tartaric acid, 16 of potash, and 8 of water. It is liable, however, to vary considerably in the proportions of its constituent principles, according to the process by which it has been prepared.

These processes have been very various, this being the most important of all the antimonials, and having therefore much engaged the attention of chemists. The principal object of their researches has been to obtain an oxide, not too expensive in its preparation, and which shall combine with facility with the tartaric acid. The oxide precipitated by potash from muriate of antimony was recommended by Bergman, and employed in the process given in the preceding edition of the Edinburgh Pharmacopœia, but was liable to the former objection, being obtained by a process somewhat difficult, and therefore expensive, and hence not being employed by the apothecary. The College have, therefore, substituted the brown oxide prepared by deflagration of sulphuret of antimony with nitre, the *Crocus of antimony* as it is named. This, however, is liable to several objections. The crocus of antimony found in the shops, which in general will be used by the apothecary, is usually prepared by the trading chemist, and the fraud has gradually been established of preparing it without the due proportion of nitre, so that it is not sufficiently oxidated to be easily soluble in the tartaric acid. Even when it is properly prepared, its state of aggregation, as Mr Phillips has remarked, prevents it from being dissolved so as to saturate the tartaric acid, unless it be reduced to a very fine powder by levigation, which renders the process expensive.

The sub-muriate of antimony is free from these objections; and the process introduced by the Dublin, and followed by the London College, is designed to afford it by a method more easy of execution, and more economical than the usual method recommended by Bergman. These advantages, however, are not attained by it, even in the formula given by the Dublin College, and still less in that of the London College, as has been already stated. It farther appears, that the oxide or sub-muriate obtained by the London process is often in such a state as to be altogether unfit for the preparation of emetic tartar, being not soluble in the solution of super-tartrate of potash; and some results with regard to this, singular, and not easily explained, have been established. Several chemists had found the process altogether to fail; the oxide when boiled with the super-tartrate of potash not being dissolved, but being retained in that state of minute division and suspension, that the liquor does not by filtration become clear; it also remains acid, and does not yield crystals by evaporation. With others, again, the process has succeeded. From the experiments of Mr Phillips, it appears, that much of the difference in the state of the oxide depends on the manner in which the digestion of the mixed nitric and muriatic acids on the sulphuret of antimony is performed, and on the extent of the evaporation, a precipitate being obtained from the solution prepared by digestion in a flask, which is dissolved by super-tartrate of potash, and furnishes emetic tartar in its proper state; while, when the digestion has been performed in a shallow vessel, the precipitate is nearly or altogether insoluble. And so liable is the preparation to variation of strength, that, as Mr Phillips has stated, products may be obtained, the strength of which varies as widely as from one to sixty. It is obvious, that a process liable to such uncertainty ought to be altogether discarded. The precipitate from the muriate, as prepared by the process of the Dublin Pharmacopœia, is more soluble, and affords, it has been stated, tartrate of antimony and potash of proper strength. The failure of the London process is therefore apparently owing to the excess of nitric acid causing the antimony to pass to too high a degree of oxidation, and thereby rendering it incapable of being dissolved by the tartaric acid. If it should be thought, that an oxide precipitated from muriate of antimony is best adapted to the formation of emetic tartar, perhaps the simplest mode of preparing the muriate, for this purpose, is to dissolve the crocus of antimony by boiling in muriatic acid, to decompose this solution by the affusion of water, and then, if necessary, to digest the sub-muriate precipitated with a dilute solution of sub-carbonate of potash, previous to boiling it with the super-tartrate of potash.

Some chemists have considered another oxide, the vitrified oxide or glass of antimony, as the one best adapted to the preparation of emetic tartar. It cannot be in an improper state of preparation; being prepared on a large scale, it is not expensive; it is dissolved by the super-tartrate, and is capable of sufficiently saturating the tartaric acid. It was accordingly recommended by Dr Black. The principal objection to it is, that it contains a portion of siliceous earth; this enters with the oxide of antimony into combination with the tartaric acid, and, when the liquor is considerably evaporated, gives to it a gelatinous consistence, and prevents the crystallization. This, however, scarcely forms a just objection, for it is always proper in the crystallization of this salt not to carry the evaporation of its solution too far. The process of crystallization itself appears to produce a division in the principles of the combination, the crystals which form first containing more oxide of antimony than those produced by a farther evaporation, and there remaining at length an uncrystallizable liquid, in which there appears to be an excess of potash combined with the acid and a portion of oxide. As the silex, therefore, does not impede the first crystallization, and as any further crystallization ought not to be attempted, its presence can scarcely be regarded as injurious, and the vitrified oxide is still perhaps the best on the whole that can be employed.

Mr Phillips has lately proposed the subsulphate of antimony, prepared by boiling two parts of sulphuric acid on one of antimony, and decomposing this by the affusion of water,—three parts of this sub-sulphate being dissolved by four of super-tartrate of potash, and affording emetic tartar of proper strength.

Another source of diversity in this preparation, to which all the methods are liable, is the extent to which the solution is evaporated to cause it to crystallize; the farther the evaporation is carried, more of the potash entering into the composition of the crystals, and the crystals obtained by a second crystallization, when this is practised, being from this cause, too, of a different composition from those of the first. Some degree of impurity is produced also, from the presence of tartrate of lime in the super-tartrate of potash; it crystallizes when the excess of tartaric acid is neutralized by the antimonial oxide, and forms the groups of acicular crystals, diverging from a common centre, which often appear in the crystallized mass. One advantage of employing a submuriate of antimony in the preparation, it is remarked by Mr Phillips, is, preventing this intermixture of tartrate of lime, the lime being retained by the muriatic acid.

These observations will shew the difficulty of preparing this salt, so as to obtain a uniform product, and how desirable it is that a proper process should be selected; affording a product as nearly as possible of the same strength as that to which practitioners have been accustomed, and which all the colleges should adopt.

Tartrate of antimony and potash crystallizes in small triedral pyramids, which are efflorescent. Its solubility has been variously stated, and appears to vary according to the quantity of antimonial oxide contained in it, from proper preparation. On an average, it is soluble in fifteen parts of water at 60°. According to Dr Saunders, one ounce of water at 60° dissolves fifty-two grains of the fully saturated salt; while of that generally met with, it dissolves from thirty-two to thirty-five. This affords even a mode of judging of the strength of this preparation. It is very susceptible of decomposition, suffering it not only from alkalis, earths, acids, and a number of neutral salts, but even from vegetable infusions and decoctions, the vegetable matter attracting apparently part of the oxygen of the oxide,—decompositions the occurrence of which requires to be guarded against in extemporaneous prescription. If kept dissolved in water, it is also decomposed, from the spontaneous decomposition of the tartaric acid.

This preparation is superior to the other antimonials, in the certainty of its operation, at least as an emetic, and, from its solubility, is more manageable with regard to dose. Its medicinal applications have been already noticed. It is given as an emetic in a dose of from one to three grains, dissolved in water; and, in smaller doses, as an expectorant and diaphoretic.

VINUM TARTRITIS ANTIMONII, *olim Vinum Antimoniale.* Wine of Tartrite of Antimony. Ed.

Take of Tartrite of Antimony, twenty-four grains; White Wine, one pound. Mix, so that the tartrite of antimony may be dissolved.

Antimonial Wine, as it was named, was formerly prepared by macerating white wine on the vitrified oxide of antimony in powder, the tartaric acid of the wine dissolving a portion of the oxide, so that the wine acquired the powers of an antimonial preparation. It was liable, however, to be variable in strength, from the proportion of acid in the wine not being uniform. The present preparation was therefore substituted for it. It may be doubted, however, whether it is properly officinal. The salt, dissolved in wine, can indeed be preserved longer without decomposition than when dissolved in water; but still on long keeping, part of the antimonial oxide is deposited. It is given as an emetic in the dose of one ounce; as a diaphoretic, in a dose of one or two drachms.

LIQUOR ANTIMONII TARTARIZATI. Solution of Tartarized Antimony. Lond.

Take of Tartarized Antimony, a scruple; Boiling Distilled Water, four fluidounces; Wine, six fluidounces. Dissolve the tartarized antimony in the boiling distilled water; then add the wine.

A preparation similar to this in the former edition of the London Pharmacopœia contained four grains of the tartrate of antimony and potash in an ounce of wine. The proportion is now reduced to one half, and it is thus with advantage rendered of the same strength as the analogous preparation in the Edinburgh Pharmacopœia, and more similar in strength also to the old antimonial wine. The dilution of the wine renders it a little more economical, but it is not improbable may have the disadvantage of admitting more readily of the spontaneous decomposition of the metallic salt.

## CUPRUM.—COPPER.

AMMONIARETUM CUPRI, *olim Cuprum Ammoniacum.* Ammoniuret of Copper.

Take of Sulphate of Copper, two parts; Carbonate of Ammonia, three parts. Rub them thoroughly in a glass mortar, until all effervescence is finished, and they unite uniformly into a violet-coloured mass, which being wrapt in bibulous paper, is to be dried, first on a chalk stone, and afterwards with a gentle heat. It is to be kept in a glass phial well stopt.

CUPRUM AMMONIATUM. Ammoniated Copper. Lond.

Take of Sulphate of Copper, half an ounce; of Sub-carbonate of Ammonia, six drachms. Rub them together in a glass mortar, until effervescence cease; then dry the ammoniated copper wrapt up in bibulous paper with a gentle heat.

CUPRUM AMMONIATUM. Ammoniated Copper. Dub.

Take of Sulphate of Copper, an ounce; Carbonate of Ammonia, an ounce and a half. Beat them together in an earthen mortar until all effervescence cease, and they unite into a mass, which being wrapt up in bibulous paper is to be dried, and kept in a phial closed with a glass stopper.

The sulphate of copper is decomposed by the carbonate of ammonia. One portion of ammonia combines with the sulphuric acid; another portion of it unites with the oxide of copper, and the violet-coloured mass which is formed is a mixture of the two resulting compounds; or perhaps, what is more probable, the sulphuric acid is in combination with the two bases, forming a ternary compound; the water of the two salts rubbed together, renders the new compound, when it is formed, soft or moist; hence the necessity of drying it: the carbonic acid is disengaged with effervescence. The preparation is of a dark-blue colour, which it retains when dried. It has been chiefly employed as a remedy in epilepsy. It is given in a dose of at first half a grain twice a-day, which is gradually and slowly increased to two or three grains, and continued for some time; and for internal administration, it has the advantage, over the salts of copper, of being less liable to excite vomiting.

Liquor cupri ammoniati. Solution of Ammoniated Copper. Lond.

Take of Ammoniuret of Copper, a drachm; Distilled Water, a pint. Dissolve the ammoniuret of copper in the water, and filter the solution through paper.

This is a simpler mode of obtaining a preparation which has had a place in the Pharmacopœias, and which used to be obtained by an indirect mode given in the following formula, which retains its place in the Dublin Pharmacopœia. The quantity of ammonia, however, is not sufficient to retain the whole oxide of copper dissolved in this large quantity of water, and therefore a portion of the oxide is precipitated.

Aqua cupri ammoniati. Water of Ammoniated Copper. Dub.

Take of Lime Water, eight ounces; Muriate of Ammonia, two scruples; Prepared Verdigrease, four grains. Mix them together, and digest for twenty-four hours; then pour off the pure liquor.

In this indirect mode of combining oxide of copper with ammonia, the lime decomposes the muriate of ammonia, by combining with the muriatic acid, and the disengaged ammonia combines with the oxide of copper of the verdigrease or sub-acetate of copper, forming a dilute solution of ammoniureted oxide of copper. The preparation is therefore essentially the same with that of the preceding formula. It has been applied, diluted with an equal part of water, as a mild escharotic, to remove specks from the cornea, and sometimes, in its undiluted state, as a stimulant and escharotic to ulcers.

SOLUTIO SULPHATIS CUPRI COMPOSITA, *olim Aqua Styptica.*
Compound Solution of Sulphate of Copper. Ed.

Take of Sulphate of Copper, Sulphate of Alumine, of each three ounces; Water, two pounds; Sulphuric Acid, one ounce and a half. Boil the sulphates in water, that they may be dissolved; then to the liquor strained through paper add the acid.

This is a combination of powerful astringents. It has been applied topically to check hæmorrhage, and, largely diluted with water, as a wash in purulent ophthalmia.

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## FERRUM.—IRON.

FERRI LIMATURA PURIFICATA. Purified Filings of Iron. Ed.

A sieve being placed over the filings, let a magnet be applied, that the filings may be drawn through the sieve upwards.

The iron, from the facility with which it is attracted by the magnet, is by this operation obtained pure, the interposition of the sieve in a great measure preventing particles of other metals, or impurities which are generally mixed with iron-filings got from the work-shops, from being entangled in the cluster which adheres to the magnet. The process, though not always attended to in the shops, is a necessary one, where iron is to be medicinally employed in this form, or where it is to serve for other preparations of this metal.

OXIDUM FERRI NIGRUM PURIFICATUM, *olim Ferri Squamæ Purificatæ.* Purified Black Oxide of Iron. Ed.

Let the Scales of Black Oxide of Iron, which are found at the anvils of the workmen, be purified by the application of the magnet; for the magnet attracts only the more thin and pure scales, leaving those which are larger and less pure.

OXIDUM FERRI NIGRUM. Black Oxide of Iron. Dub.

Purify the Scales of Oxide of Iron which are found at the anvils of the workmen, by applying a magnet; then reduce them into powder, of which the finer particles are to be separated in the manner directed in the preparation of chalk.

The scales of iron are the small fragments struck off from the metal when it is heated red hot. Passing through the atmosphere, at this temperature, they are oxidated, but so imperfectly, as to retain their magnetic quality, and therefore to admit of this mode of purification by the magnet. They are used only in making some of the other chalybeate preparations.

CARBONAS FERRI PRÆPARATUS, *olim Rubigo Ferri Præparata.* Prepared Carbonate of Iron. Ed.

Purified Filings of Iron are to be frequently moistened with water till they fall into rust, which is to be rubbed to a fine powder.

FERRI RUBIGO. Rust of Iron. Dub.

Take of Iron Wire, any quantity; cut it into small parts, which being exposed to the air, moisten frequently with water until they pass into rust; then rub them in an iron mortar, and by the affusion of water, wash away the finest powder; which dry.

During exposure to air and moisture, iron is oxidated, and this oxide is found to be combined with carbonic acid, absorbed probably from the atmosphere; it is not a carbonate, however, but a sub-carbonate: As a chalybeate it is rather more active than the pure metal, and more mild than the other saline combinations of iron. Its dose is from 10 to 20 grains. In a large dose it is liable to occasion uneasiness at the stomach. As an external application it has been employed in cancerous ulceration, the levigated powder being formed into a paste with water: this is spread over the surface of the sore, and is removed every twelve hours: its efficacy in real cancer is very doubtful; but in some forms of ulceration it appears to mitigate the pain, correct the acrimony and fœtor of the discharge, and cause the ulcer to heal. Its operation is promoted by its internal exhibition in the usual dose.

CARBONAS FERRI PRÆCIPITATUS. Precipitated Carbonate of Iron. Ed.

Take of Sulphate of Iron, four ounces; Carbonate of Soda, five ounces; Water, ten pounds. Dissolve the sulphate of iron in the water; then add the carbonate of soda, previously dissolved in as much water as may be necessary, and mix them well together. Let the carbonate of iron, which is precipitated, be washed with warm water, and afterwards dried.

FERRI CARBONAS. Carbonate of Iron. Lond.

Take of Sulphate of Iron, eight ounces; Sub-carbonate of Soda, ten ounces; Boiling Water, a gallon; dissolve separately the sulphate of iron and sub-carbonate of soda in four pints of the water; mix the liquors together, and put aside, that the powder may subside; then having poured off the liquor above, wash the carbonate of iron with warm water, and having wrapt it up in blotting paper, dry it with a gentle heat.

CARBONAS FERRI. Carbonate of Iron. Dub.

Take of Sulphate of Iron, four ounces; Carbonate of Soda, five ounces; Water, ten pints. Dissolve the sulphate of iron in the water; then add the soda previously dissolved in a sufficient quantity of water, and mix them together. Wash the carbonate of iron which is precipitated with tepid water, and afterwards dry it.

On mixing the solutions of carbonate of soda and sulphate of iron, the soda attracts the sulphuric acid; the carbonic acid in whole or in part combines with the oxide of iron; the sulphate of soda remains in solution; the carbonate of iron is precipitated. It is to be remarked, however, with regard to this, and all the saline combinations of iron, that the metal enters into them in different states of oxidation, and thus produces very different salts. There is one oxide, the black, nearly at the *minimum*, containing, according to Lavoisier's estimate, 27·of oxygen in 100, which forms one order of salts; there is another, the red oxide, at the maximum, which, according to Proust, contains 0.48; which is the base of another series of saline compounds, and between these are probably also intermediate combinations. In the present process, the sulphate of iron which is employed containing the metal in the low state of oxidation, it is this oxide which combines with the carbonic acid; but the compound attracts very rapidly oxygen from the atmospheric air, so as to pass to a higher state of oxidation, and it appears at the same time to lose the greater part of its carbonic acid. From these changes the precipitate of carbonate of iron, in washing and drying, changes its colour, from a dark green to a reddish brown. It differs ultimately, therefore, in little from the rust of iron, except that it may be somewhat purer. Both are probably sub-carbonates, and the quantity of carbonic acid appears even to be inconsiderable. Sub-carbonate of potash is more economical than carbonate of soda in producing the precipitate, and it gives even a larger precipitate, as the excess of carbonic acid derived from the latter retains a portion of the product dissolved. For the same reason it is advantageous to mingle the solutions warm. On the other hand, the precipitate by carbonate of soda retains a larger quantity of carbonic acid.

Carbonate of iron, containing the metal at a low state of oxidation, is a mild and not inactive preparation, preferable to the carbonate or rust, in which the iron is in a higher state of oxidation, as sitting easier on the stomach. The formula of Griffith, which has been highly celebrated as a chalybeate, it has already been remarked, is a preparation of this kind; and as introduced into the London Pharmacopœia, under the name of Mistura Ferri Composita, has been already considered, (page 33.). It is as an extemporaneous preparation (in which only it is obtained at the low state of oxidation) that it ought to be used; and in the state in which it is obtained by the present process, it has probably little advantage over the common rust of iron.

SULPHAS FERRI, *olim Vitriolum Viride.* Sulphate of Iron. Ed.

Take of Purified Filings of Iron, six ounces; Sulphuric Acid, eight ounces; Water, two pounds and a half. Mix them; and the effervescence being over, digest for a short time in a sand-bath; then strain the liquor through paper, and, after due evaporation, put it aside that crystals may form.

FERRI SULPHAS. Sulphate of Iron. Lond.

Take of Iron, of Sulphuric Acid, each eight ounces; of Water, four pints. Mix the sulphuric acid with the water in a glass vessel, and add to them the iron; then, when effervescence has ceased, strain the liquor through paper, and evaporate it, so that, when it cools, crystals may form. Having poured off the water, dry these on bibulous paper.

SULPHAS FERRI. Sulphate of Iron. Dub.

Take of Iron Wire, two ounces; Sulphuric Acid, three ounces and a half; Water, a pint. Mix the acid slowly with the water in a glass vessel; add gradually the iron wire cut down; digest the mixture so as to dissolve the metal, and strain the liquor through paper; lastly, after due evaporation, put it aside, so that by slow cooling crystals may form.

Iron decomposes water very slowly at a low temperature, but when aided by the action of sulphuric acid the decomposition goes on rapidly. The effect in this case may be ascribed, according to the doctrine of disposing affinity, to the concurrent affinities of the iron to oxygen, of the acid or rather the base of the acid to oxygen, and of the acid to iron. These co-operating prevail over the single affinity of the oxygen to the hydrogen of the water: the water therefore is decomposed; its oxygen, the iron, and the acid unite, and the hydrogen is disengaged in the elastic form. The iron in this combination is at a low state of oxidation, the *minimum* nearly; and the salt which it forms is the Green Sulphate of Iron, so named, to distinguish it from the Red Sulphate, in which the metal is more highly oxidated. This green sulphate is prepared for the various purposes to which it is applied in the arts, on a large scale, by exposing the native sulphuret of iron to air and moisture; by the absorption of oxygen, the iron is oxidated, the sulphur is converted into sulphuric acid, and by lixiviation the sulphate of iron is extracted. By the present process, however, it is obtained in a purer state, and fitter therefore for medicinal use. Its crystals are of a light green colour; the residual liquor, by a second evaporation, affords crystals of a darker green, in which the metal appears to exist more highly oxidated. In the shops there is often substituted for this salt the common green vitriol, purified by a second crystallization, a little acid having been added to the solution, to dissolve any excess of oxide.

Sulphate of iron is one of the most active preparations of the metal. Its medium dose is from three to five grains: its medicinal applications have been already noticed. The red sulphate, in which the metal is more highly oxidated, appears to be still more active. Its preparation and properties have also been stated under the general history of iron.

SULPHAS FERRI EXSICCATUS. Dried Sulphate of Iron. Ed.

Take of Sulphate of Iron, any quantity. Heat it in an unglazed earthen vessel, on a gentle fire, until it become white and perfectly dry.

SULPHAS FERRI EXSICCATUM. Dried Sulphate of Iron. Dub.

Take of Sulphate of Iron, any quantity. Render it dry and white by exposing it to a strong heat in an unglazed earthen vessel.

This is the sulphate of iron freed from its water of crystallization by the application of heat. It is not medicinally employed, but has a place in the Pharmacopœia from being used in one or two pharmaceutical preparations.

OXIDUM FERRI RUBRUM. Red Oxide of Iron. Ed.

Let dried Sulphate of Iron be exposed to a violent heat, until it is converted into a red coloured matter.

OXIDUM FERRI RUBRUM. Red Oxide of Iron. Dub.

Calcine dried Sulphate of Iron, with a very strong fire, until it is converted into a red coloured matter; wash this, until by the test of litmus the water poured off appears to be free from acid; dry it on bibulous paper.

By an intense heat, sulphate of iron is decomposed; its acid its partly expelled, and in part suffers decomposition, being evolved in the state of sulphurous acid; the metal at the same time becomes more highly oxidated. The red oxide is the residuum. To free it more completely from any adhering acid, the Dublin College order it to be washed with water. It is scarcely medicinally employed, but is used in some pharmaceutical preparations.

TINCTURA MURIATIS FERRI. Tincture of Muriate of Iron. Ed.

Take of Purified Black Oxide of Iron, in powder, three ounces; Muriatic Acid, about ten ounces, or as much as may be sufficient to dissolve the powder. Digest with a gentle heat, and, when the powder is dissolved, add as much alkohol as that there shall be of the whole liquor two pounds and a half.

TINCTURA FERRI MURIATIS. Tincture of Muriate of Iron. Lond.

Take of Carbonate of Iron, half a pound; Muriatic Acid, a pint; Rectified Spirit, three pints. On the carbonate of iron, in a glass vessel, pour the muriatic acid, and agitate them occasionally for the space of three days. Put aside, that the impurities, if there are any, may subside, and having poured the liquor off, add to it the spirit.

TINCTURA FERRI MURIATIS. Tincture of Muriate of Iron. Dub.

Take of Rust of Iron, half a pound; Muriatic Acid, three pounds; Rectified Spirit of Wine, three pints. To the rust, put into a glass vessel, add the acid, and agitate occasionally during three days. Put aside, that the impurities may subside, and pour off the clear liquor. Reduce this by slow evaporation to a pint, and when cold add the spirit.

Iron, in combining with acids, it has already been remarked, unites with them in different degrees of oxidation; and when at the two extremes, or the *minimum* and *maximum*, forms with the same acid very different salts. This is well displayed in its combination with muriatic acid. When metallic iron is dissolved in the acid, the solution is of a pale green colour, and affords crystals of a similar colour on evaporation. This salt is soluble in water, but is insoluble in alkohol. When the red oxide or the carbonate is dissolved in the acid, the solution is of a yellow colour; it is not crystallizable, but by evaporation is reduced to a deliquescent mass; it is soluble in water, and is abundantly soluble in alkohol. Of course, it must be this salt which forms the basis of the tincture formed by the present process. In the process, as performed according to the formula of the Edinburgh Pharmacopœia, the black oxide which is employed combines with the muriatic acid, and during the solution acquires more oxygen, principally from a partial decomposition of the water, which is promoted by the heat applied. The muriate of iron, in which this more perfect oxide is contained, is soluble in the alkohol, diluted as it is to a certain extent by the water of the acid; yet even with this, the metal is scarcely sufficiently oxidated to form the salt, which is entirely soluble in alkohol. The tincture formed is of a pale green colour; and it even sometimes happens, that if the solution of the iron has been slowly performed, on adding the alkohol to it, a great part of the salt is precipitated in crystalline grains. But in a short time, from exposure to the air, oxygen is absorbed, the colour deepens to a yellow, and the precipitate is dissolved. In the process given in the other Pharmacopœias, the metal is submitted to the action of the acid in a higher state of oxidation, as it exists in such a state in the rust which is ordered; and the compound is at once formed, which is soluble in alkohol. It may therefore be supposed to be preferable, as there is some risk of the other not being properly prepared, from the tincture being perhaps poured off from the precipitate, instead of being allowed to remain over it until it is dissolved. It appears, however, that the metal may be too highly oxidated to remain in combination with the acid, this tincture always depositing a sediment of oxide when long kept, and this is perhaps more liable to happen when the metal is even at the first in a highly oxidated state. From the proportions in the Dublin formula, the tincture prepared by it must have a considerable excess of acid, and this may perhaps prevent any such precipitation of the oxide.

This tincture of red muriate of iron is a very grateful preparation; the alkohol appears to suffer some chemical change from the action of the acid and the metallic oxide, the odour becoming ethereal. It is a preparation also highly active. It is given, as has been already stated, in the diseases in which iron is employed, in a dose from ten to twenty drops, largely diluted with water, or, what is more grateful, in wine. If it produce irritation at the stomach, as it is liable to do from its activity, the dose must be diminished.

TINCTURA MURIATIS FERRI CUM OXYDO RUBRO. Tincture of Muriate of Red Oxide of Iron. Dub.

Take of Red Oxide of Iron, an ounce; Muriatic Acid, four ounces; Rectified Spirit of Wine, as much as may be sufficient. Digest the oxide with the acid for twenty-four hours; then boil for half an hour; evaporate the strained liquor until it attain the consistence of syrup, and when cold, add to it rectified spirit of wine, shaking frequently, until the specific gravity of the tincture is to that of distilled water as 1050 to 1000.

This tincture being prepared from the red oxide may perhaps be more active than the other; yet it is probable, that the degree of oxidation in the rust of iron is not much inferior, and that the two tinctures will not differ greatly in power.

MURIAS AMMONIÆ ET FERRI, *olim Flores Martiales.* Muriate of Ammonia and Iron. Ed.

Take of Red Oxide of Iron, washed and again dried, Muriate of Ammonia, of each equal weights. Mix them well together, and sublime.

FERRUM AMMONIATUM. Ammoniated Iron. Lond.

Take of Carbonate of Iron, Muriate of Ammonia, each a pound; mix them thoroughly; then applying a strong heat, sublime quickly; lastly, rub into powder.

MURIAS AMMONIÆ et FERRI. Muriate of Ammonia and Iron. Dub.

Take of Red Oxide of Iron, Muriate of Ammonia, each equal weights. Having mixed them well, sublime with a sudden heat sufficiently strong.

Oxide of iron decomposes muriate of ammonia, by attracting the muriatic acid, and, in the present process, this decomposition takes place, ammoniacal gas being exhaled. But, from the proportions of the substances employed, part of the muriate of ammonia escapes decomposition, is sublimed by the heat applied, and elevates with it part of the muriate of iron that had been formed; or rather, perhaps, the oxide of iron enters into combination with the acid and part of the ammonia, forming a triple compound. Whichever of these is the result, the process is an unscientific mode of obtaining a muriate of iron; the product, too, has been found uncertain in strength, more of the muriate of iron being sublimed, according as the heat is applied strongly and quickly. The variation introduced by the London College of employing carbonate of iron appears to be improper, as probably carbonate of ammonia will be formed and sublimed. Muriate of ammonia and iron is in crystalline grains, of a yellow colour, and somewhat deliquescent. It was principally employed as a remedy in rickets, in a dose to children of two or three grains; but is now little used.

TINCTURA FERRI AMMONIATI. Lond.

Take of Ammoniated Iron, four ounces; Proof-spirit, one pint. Digest and strain.

This solution of the preceding compound is an unnecessary preparation, as it differs little from the tincture of muriate of iron, and must be less certain with regard to strength.

FERRUM TARTARISATUM. Tartarised Iron. Lond.

Take of Iron, one pound; Super-tartrate of Potash in powder, two pounds; Distilled Water, one pint. Rub them together, and expose the mixture to the air in an open glass vessel for eight days; then dry it by a sand-bath, and rub it into a very fine powder. Put aside this powder, having again added to it a pint of water, for eight days, then dry it, and rub it into a powder.

By exposure to air and moisture, the iron is oxidated, and its oxide combines with the excess of acid in the super-tartrate of potash, a triple compound resulting, composed of potash, oxide of iron, and tartaric acid, though a considerable portion still remains metallic. It forms a powder of a greenish brown colour, which attracts moisture from the air, but does not deliquesce. By repeating the trituration and exposure to the air in a humid state, the oxidation of the iron is rendered more complete. The Dublin College give the following formula, by which the saline combination is rendered more perfect.

TARTARUM FERRI. Tartar of Iron. Dub.

Take of Carbonate of Iron, half an ounce; Crystals of Tartar in fine powder, one ounce; Distilled Water, a pint. Boil them together in a glass vessel, over a slow fire, for an hour, and filtrate the liquor through paper. After it has cooled, and has been filtrated a second time, evaporate it until a pellicle appear on its surface. The liquor, by cooling, forms a saline mass, which is to be reduced to powder, and kept in close vessels.

This is the proper tartrate of iron and potash, as much of the oxide of iron of the carbonate, as the free tartaric acid of the super-tartrate of potash requires for saturation, being dissolved, and the ternary compound being obtained by evaporation. Both this, and the less perfect analogous compound obtained by the preceding process, have been introduced as mild, and, at the same time, active preparations of the metal. It is soluble in water, and may therefore be given in a state of solution, and considersbly diluted, a form in which the saline preparations of iron always prove less irritating. It is stated, too, by Mr Phillips, that when the acid of the super-tartrate is fully saturated with the iron, the taste of the metal is scarcely perceptible : the preparation is therefore less nauseous than other chalybeates in the liquid form. The dose is from five to fifteen grains. The preparation obtained by this formula of the Dublin College has not only been employed in the usual diseases in which iron is prescribed, but has also been highly recommended as a remedy in dropsy, from the combination of its tonic with a diuretic power ; and from its mildness, it is well adapted for administration in scrofula to children in a small dose.

VINUM FERRI. Wine of Iron. Lond.

Take of Iron-Filings, two ounces ; Wine, two pints. Mix them together, and put aside for a month, shaking them frequently ; then strain through paper.

VINUM FERRI. Wine of Iron. Dub.

Take of Iron Wire cut, four ounces ; Rhenish White Wine, four pints. Sprinkle the iron-filings with a little wine, and expose them to the air, until they are covered with rust ; then add the remaining wine ; digest for seven days, shaking occasionally ; lastly, strain.

The tartaric acid of the wine contributes to the oxidation of the iron, and dissolves the oxide ; and in the mode directed by the Dublin College, being aided by the action of the air, the oxidation, and consequent impregnation of the wine with iron will probably take place to a greater extent. The acidity of the Rhenish wine will likewise contribute to this. Still the preparation must be liable to be variable in strength, and can scarcely be regarded as possessed of any advantage. It has been given as a chalybeate in a dose of one or two drachms.

ACETAS FERRI. Acetate of Iron. Dub.

Take of Carbonate of Iron, half an ounce; Acetic Acid, three ounces. Digest them for three days, and strain the liquor.

In this process, the acetic acid dissolves the iron, and may afford a mild and active chalybeate, probably, however, not differing much in its operation from the tartrate of iron.

TINCTURA ACETATIS FERRI. Tincture of Acetate of Iron. Dub.

Take of Acetate of Potash, two ounces; Sulphate of Iron, one ounce; Rectified Spirit, two pints. Rub together the acetate of potash and the sulphate of iron in an earthen mortar, until they unite into a soft mass. Dry this with a moderate heat; rub the dried matter with the spirit; put the mixture into a phial closely corked, and digest for seven days, agitating it frequently; lastly, pour off the clear liquor from the impurities.

TINCTURA ACETATIS FERRI CUM ALKOHOL. Tincture of Acetate of Iron with Alkohol. Dub.

Take of Sulphate of Iron, Acetate of Potash, each one ounce; Alkohol, two pints. Rub the acetate of potash and sulphate of iron in an earthen mortar until they unite into a soft mass; then dry with a moderate heat, and when cold rub it with the alkohol. Put the mixture into a phial well stopt, and digest for twenty-four hours, shaking occasionally; lastly, pour off the clear tincture from the impurities.

These tinctures are the same, with the difference, probably unimportant, in the proportion of acetate of potash, and the trivial substitution of alkohol for rectified spirit. In the action of the two salts, the acetic acid will be combined with the oxide of iron, forming acetate of iron, while the sulphuric acid is united with the potash, so as to form sulphate of potash, at least these binary combinations will be rendered more complete by the action of the alkohol added, sulphate of potash being nearly insoluble in that liquid, while acetate of iron can be dissolved. During the trituration too, it is probable that the oxide of iron absorbs oxygen from the air, and the salt formed, therefore, will be the one containing the metal at the higher degree of oxidation, and which alkohol more easily dissolves. The tincture may have the advantage over the watery solution of acetate of iron formed by the first process, of being less liable to spontaneous decomposition; but it must be regarded as altogether superfluous to have two tinctures differing probably in little more than in strength, or indeed to have more than one form of acetate of iron, if there was any necessity for its introduction as an officinal preparation, which is doubtful. The preparations of this metal in the Pharmacopœias are more numerous than what are required in practice.

LIQUOR FERRI ALKALINI. Alkaline Solution of Iron. Lond.

Take of Iron, two drachms and a half; Nitric Acid, two fluidounces; Distilled Water, six fluidounces; Solution of Subcarbonate of Potash, six ounces. Pour the acid and the water mingled together on the iron; and when the effervescence has ceased, pour off the liquor while still acid. Add this gradually, and at intervals, to the solution of sub-carbonate of potash, agitating frequently, until the colour, having become of a brownish red, effervescence is no longer excited. Put it aside for six hours, and then pour off the liquor.

This is a preparation, which has long been known under the name of Martial Alkaline Tincture, and the nature of it is not very well ascertained. The iron is oxidated and dissolved by the nitric acid; and the solution which answers best for its preparation, appears to be that in which the metal is in a low state of oxidation, and in which there is an excess of acid; this is obtained by the solution being effected slowly, and, when in this state, it is of a pale green colour. On adding the solution to the sub-carbonate of potash, the alkali saturates a portion of the acid, and the oxide or rather sub-nitrate of iron is precipitated, but by agitation it is kept suspended, and by the excess of alkali is redissolved, this being accompanied with effervescence from the disengagement of part of the carbonic acid. If the reverse mode of adding the alkaline carbonate to the solution of iron is followed, much of the oxide is precipitated, and is not redissolved even by the excess of alkali. According to this view, the liquid is a ternary compound of oxide of iron, nitric acid and potash. It has often been remarked, however, by chemists, that more of the precipitate is redissolved, when carbonate of potash is employed, than when pure potash is used; and this would lead to the conclusion, that a portion of the carbonic acid is likewise retained in the combination, and probably contributes, by its action on the alkali and the oxide, to maintain the state of solution. On standing, a portion of nitre, formed from the union of the potash and nitric acid is deposited, from which the clear liquor is to be poured off; and by this formation of nitre, it is not improbable that the whole, or the greater part of the nitric acid is withdrawn. It will then be a carbonate of potash and iron. Mr Phillips has remarked, that the proportion of alkaline carbonate ordered by the College is rather too small to retain the oxide dissolved: it requires about one-twelfth more.

This preparation is of a deep reddish brown colour, transparent, or frequently somewhat turbid, especially from the action of the air. It has a styptic alkaline taste. From the variable state in which it is obtained, from the operation of very trivial circumstances in conducting the process, it must be liable to uncertainty of strength; and it has farther been stated by the older chemists, that on being kept, it deposites much of its iron, — a change very likely to happen from the metal passing to a higher state of oxidation. Mr Phillips has also stated, that it is decomposed by water, five parts of water added to one of the solution precipitating oxide of iron in a few minutes. It is therefore so far defective. The advantages belonging to it as a chalybeate have been stated under the general history of iron.

## HYDRARGYRUS.—QUICKSILVER.

**Hydrargyrus purificatus.** Purified Quicksilver. Ed.

Take of Quicksilver, four parts; Iron Filings, one part. Rub them together and distil from an iron vessel.

**Hydrargyrus purificatus.** Purified Quicksilver. Lond.

Take of Quicksilver, six pounds; Iron Filings, one pound. Rub them together; then applying heat, distil the quicksilver from an iron retort.

**Hydrargyrum purificatum.** Purified Quicksilver. Dub.

Take of Quicksilver, six pounds; Distil slowly four pounds.

The quicksilver of commerce has been supposed to be frequently adulterated with other metals. To obtain it perfectly pure is the design of this process. The addition of the iron-filings renders the distilled quicksilver more bright and mobile, an effect not perfectly explained, but ascribed to the iron retaining combined with it any foreign metal, or any portion of carbon that might have been contained in the quicksilver. But the process is in reality not very necessary; for although quicksilver is easily adulterated, this does not appear to be often practised, what is met with in commerce being in general nearly pure. The distillation, too, is rather difficult of execution, from the weight of the quicksilver and the high temperature that requires to be applied. Wherever there is reason, however, to suspect any impurity, the purification by this method ought to be performed. The Dublin formula is deficient both as omitting the iron, and directing only four pounds out of six to be distilled,—an unnecessary waste, to which it is not to be supposed the apothecary will submit.

ACETIS HYDRARGYRI. Acetite of Quicksilver. Ed.

Take of Purified Quicksilver, three ounces; Diluted Nitrous Acid, four ounces and a half, or a little more than may be requisite to dissolve the quicksilver; Acetite of Potash, three ounces; Boiling Water, eight pounds. Mix the quicksilver with the diluted nitrous acid; and towards the end of the effervescence, digest, if necessary, with a gentle heat, until the quicksilver be entirely dissolved. Then dissolve the acetite of potash in the boiling water, and immediately on this solution, while hot, pour the other, and mix them both by agitation. Then put aside, that crystals may be formed. These being placed in a funnel, wash them with cold distilled water; and, lastly, dry them with a very gentle heat. In preparing the acetate of quicksilver, it is necessary that all the vessels and the funnel which are employed should be of glass.

ACETAS HYDRARGYRI. Acetate of Quicksilver. Dub.

Take of Purified Quicksilver, three ounces; Diluted Nitrous Acid by measure, three ounces; Acetate of Potash, three ounces; Boiling Distilled Water, eight pints. Add the acid to the quicksilver, and the effervescence being over, digest on warm sand, that the metal may be dissolved; immediately mix the solution with the boiling water in which the acetate of potash has been previously dissolved: then pass the mixture quickly through double linen; let it cool that crystals may form; these, being washed with distilled cold water, dry on paper with a very gentle heat. In the whole operation glass vessels must be used.

Acetic acid, like the other acids, combines with mercury in different states of oxidation, and forms salts which are different in their properties. When the metal is in a high state of oxidation, a salt is formed which is acrid and soluble; when in a lower state of oxidation, the salt obtained is more mild and sparingly soluble. The object of the present process is to obtain the latter of these salts: it may be doubted, therefore, if the application of heat directed by both colleges to promote the solution of the mercury is proper, as it causes it, in dissolving, to pass to a too highly oxidated state. It has another disadvantage; that the acid being saturated with oxide, the solution is capable of being decomposed by water, and a sub-nitrate is precipitated; and accordingly this happens, when a solution, prepared with the aid of heat, is added to a solution of acetate of potash. By employing an excess of acid, this is counteracted to a certain extent, and from this circumstance, the process, as given in the Edinburgh Pharmacopœia, may succeed, while that of the Dublin College is more liable to fail. It is better, however, to avoid these sources of error entirely, by allowing the solution of the mercury in the acid to proceed in the cold, pouring off the solution from any undissolved mercury, and adding it to the solution of acetate of potash warm. On mixing the two solutions, the nitric acid of the nitrate of mercury combines with the potash of the acetate of potash, while the acetic acid unites with the oxide of mercury, and the acetate of mercury at a low degree of oxidation is formed. It remains at first dissolved, but on the liquid cooling a little, it appears in the form of delicate crystals, of a white colour and silvery lustre. Instead of employing boiling water to dissolve the acetate of potash, it is preferable to use only tepid water, as at a high temperature the water is liable to produce a partial decomposition of the acetate, so that it becomes of a yellow colour from a slight excess of oxide. It is necessary, too, not to continue to wash the salt after it is formed with much water, for a similar partial decomposition takes place, and the crystals become yellow. If this should happen, the brilliant whiteness is instantly restored by washing them with a little diluted distilled vinegar, the acetic acid neutralizing the excess of oxide to which the yellow colour is owing. With these precautions, the process, which often fails when they are not attended to, is easily conducted, and the preparation is obtained perfectly uniform, and in a proper state.

Acetate of mercury crystallizes in small brilliant scales. It is soluble in hot, and insoluble in cold water. As an antisyphilitic remedy, it is very mild in its operation ; but its effects are not considered as sufficiently permanent to allow of its being relied on in effecting a radical cure. Its dose is a grain, night and morning.

### MURIAS HYDRARGYRI, *olim Mercurius Sublimatus Corrosivus*. Muriate of Quicksilver. Ed.

Take of Purified Quicksilver, two pounds ; Sulphuric Acid, two pounds and a half; Muriate of Soda, dried, four pounds. Boil the quicksilver with the sulphuric acid in a glass vessel placed in a sand-bath, until the matter become dry. Mix this when cold in a glass vessel with the muriate of soda ; then sublime it in a glass cucurbit with a heat gradually raised. Separate the sublimed matter from the scoriæ.

**Hydrargyri oxymurias.** Oxymuriate of Quicksilver. Lond.

Take of Purified Quicksilver, two pounds; Sulphuric Acid, thirty ounces; Muriate of Soda, dried, four pounds. Boil the quicksilver with the sulphuric acid in a glass vessel, until the sulphate of mercury become dry. Rub this when it has cooled, with the muriate of soda in an earthen mortar; then sublime it from a glass cucurbit with a heat gradually raised.

**Murias hydrargyri corrosivum.** Corrosive Muriate of Quicksilver. Dub.

Take of Purified Quicksilver, two pounds; Sulphuric Acid, three pounds; Dried Muriate of Soda, two pounds and a half. Dissolve the quicksilver in the acid; and increase the heat gradually until the matter become perfectly dry. Rub this when cold, with the muriate of soda in an earthen mortar; then sublime it in a proper vessel with a fire gradually raised.

These processes are nearly the same, except that in the formula of the Dublin Pharmacopœia, rather a larger quantity of sulphuric acid is ordered, and a considerably smaller quantity of muriate of soda. The excess of acid, if it is not dissipated in the evaporation, will be useful, as decomposing the muriate of soda more completely; and if the proportion of muriate of soda be sufficiently large to afford the quantity of muriatic acid requisite to the saturation of the oxide of mercury in the sulphate, the reduction of it from the larger proportion ordered in the other Pharmacopœias will be an advantage, as it will render it more easy to apply a due degree of heat in the subliming vessel to the whole mixture. On this point comparative experiments would require to be made.

In the first stage of the general process, the sulphuric acid, aided by the high temperature, oxidates the mercury, and combines with the oxide; the salt formed being that which contains the metal in a high state of oxidation. This salt, in its dry state, is mixed with the muriate of soda, and, by the application of heat, a double decomposition is effected; the soda attracts the sulphuric acid, and the muriatic acid combines with the oxide of mercury. The muriate of mercury being easily volatilized, is separated from the sulphate of soda by sublimation. The process formerly employed in the preparation of this important mercurial salt, consisted in mixing together sub-nitrate of mercury, muriate of soda, and dried sulphate of iron, and subliming the muriate of mercury, formed by the re-action of these, by the application of a sufficient heat. The present process originally proposed by Kunckel has been substituted as more simple, and more economical, from the expence of the nitric acid in preparing the sub-nitrate of mercury being avoided. There is reason to doubt, however, whether from a given weight of mercury it affords the same quantity of product; a deficiency arising from the dry sulphate of mercury not containing a sufficient quantity of acid to decompose as much muriate of soda as is requisite to afford the muriatic acid necessary to convert the whole of the oxide of mercury into muriate. The enlarged proportion of sulphuric acid, and diminished proportion of muriate of soda, directed by the Dublin College, are perhaps in this respect useful.

This mercurial, corrosive sublimate as it was formerly named, having long been established in medical practice, has been frequently submitted to chemical analysis. The earlier analyses were necessarily incorrect. The investigation of the composition of this and the other muriate of mercury, the mild sublimate or calomel, was some years ago undertaken by Mr Chenevix, and the relative proportions of their principles determined. It had been supposed by some chemists, that the corrosive sublimate is a compound of oxide of mercury with oxymuriatic acid; this supposition, he found no reason to admit, the compound consisting of mercury in a high state of oxidation united with muriatic acid; the oxide, which is its basis, he concluded, consists of 85 of mercury, and 15 of oxygen; and 100 parts of the salt are composed of 82 of this oxide, and 18 of muriatic acid. Its ultimate principles, therefore, and their proportions, are 18 of acid, 12.3 of oxygen, and 69.7 of quicksilver. Zaboada, from a more recent analysis, has inferred, that the oxide does not contain more than 10 of oxygen in 100 parts, and that 80 of this oxide are combined with 20 of acid. According to this, the ultimate principles and their proportions will be 20 of acid, 8.5 of oxygen, and 71.5 of quicksilver. Some other chemists have given results nearly the same.

According to the hypothesis which considers oxymuriatic acid as a simple substance, the corrosive sublimate is a compound of it with metallic quicksilver. According to this hypothesis, when the muriatic acid acts on the oxide of mercury, instead of combination, they suffer mutual decomposition; the hydrogen of the muriatic acid combines with the oxygen of the oxide; while the oxymuriatic principle or chlorine, the other supposed element of the acid, unites with the metallic mercury, and forms the corrosive sublimate.

The impropriety of the term Oxymuriate of Mercury, given to this salt by the London College, has been pointed out in the observations on the nomenclature of the metallic salts. Neither is the name Muriate of Mercury, given to it by the Edinburgh College, sufficiently distinctive. In modern chemical writings, this name is even frequently given to the other Muriate of Mercury, in which the metal is at a lower state of oxidation,—a circumstance which must render this as a medical nomenclature extremely hazardous. The name Corrosive Muriate of Mercury is the one which deviates least from the principles on which the system of chemical language is established, and the one which ought to be adopted, considered in relation to its medicinal application, as affording the most marked distinction, and approaching nearest to the appellation by which it has been long known.

Corrosive muriate of mercury is obtained by sublimation in the form of a dense crystalline mass: when sublimed slowly, it condenses in slender prismatic crystals; and it is obtained in a similar form by crystallization from its watery solution. It is easily soluble in water, requiring 20 parts at 60° for its solution, and 2 parts at 212°. It is still more soluble in alkohol, requiring scarcely 4 parts at 60°. Its taste is acrid and metallic. It changes to a green several vegetable colours; is decomposed by the alkalis and earths, and by a number of compound salts, and likewise by vegetable infusions.

It is the most powerful of the mercurial preparations. Its dose cannot safely exceed the fourth of a grain, nor can more than one grain be given in twenty-four hours. As an antisyphilitic remedy it has long been established in practice, and, as has been already stated under its history, it possesses some advantages. It acts speedily, and its action is more general on the system, or less determined to particular organs: these advantages are more than counterbalanced, however, by the occasional violence of its operation, and by the uncertainty which attends it, so that it cannot be relied on in establishing a permanent cure. It is also employed in other diseases, particularly as an alterative in some obstinate cutaneous affections. It is given in the form of solution in water or alkohol, the dose being increased cautiously from the eighth to the fourth of a grain, night and morning, and mucilaginous diluents being freely taken, to lessen the irritation it is liable to occasion. A solution of this kind has been introduced as an officinal preparation by the London College. As the solution has a very disagreeable taste, it is sometimes made into pills with crumbs of bread, a little of it being mixed with an equal weight of muriate of ammonia, which renders it more soluble in water, this being dissolved by adding the necessary proportion of water, and the solution being formed into a mass with crumbs of bread, and divided into pills, so that each pill contains the eighth of a grain of the corrosive muriate. Externally under the form of solution it is employed as an escharotic in chancre and venereal ulcers of the mouth; and a very dilute solution of it has been used as an injection, to excite inflammation in obstinate gleet.

LIQUOR HYDRARGYRI OXYMURIATIS. Solution of Oxymuriate of Mercury. Lond.

Take of Oxymuriate of Mercury, eight grains; Distilled Water, fifteen fluidounces; Rectified Spirit, one fluidounce. Dissolve the oxymuriate in the water, and add the spirit.

This formula is designed to afford a form of preparation under which corrosive muriate of mercury may be administered, and its dose be easily regulated. An ounce contains half a grain; its dose therefore may be from one to two drachms.

SUB-MURIAS HYDRARGYRI, *olim Calomelas.* Sub-muriate of Quicksilver. Calomel. Ed. Murias Hydrargyri Mitis. Mild Muriate of Mercury.

Take of Muriate of Quicksilver, rubbed to powder in a glass mortar, four ounces; Purified Quicksilver, three ounces. Rub them together in a glass mortar, with a little water, that the operator may be guarded against the acrid powder which would otherwise arise, until the quicksilver is extinguished. Put the dried powder into an oblong phial, of which it shall fill only one-third, and let it be sublimed in a sand-bath. The sublimation being finished, and the phial broken, the red powder at the bottom and the white one about the neck of it are equally to be rejected; the remaining mass is to be again sublimed, and rubbed into a fine powder, which is lastly to be washed with boiling distilled water.

HYDRARGYRI SUB-MURIAS. Sub-muriate of Quicksilver. Lond.

Take of Oxymuriate of Quicksilver, a pound; of Purified Quicksilver, nine ounces. Rub them together, until globules no longer appear, then sublime; afterwards remove the sublimate; rub it to powder, and sublime it twice. Lastly, reduce it to a very fine powder, in the manner prescribed for preparing chalk.

SUB-MURIAS HYDRARGYRI SUBLIMATUM, sive CALOMELAS. Sublimed Sub-muriate of Quicksilver or Calomel. Dub.

Take of Corrosive Muriate of Mercury, a pound; Purified Quicksilver, nine ounces. Rub them together until the globules disappear, and sublime with a heat sufficiently strong. Having rubbed down the sublimed matter, sublime it again, and reduce it to powder, which wash with distilled water, until the liquor poured off no longer afford any precipitate on a few drops of water of carbonate of potash being added to it; lastly, dry it.

This is, perhaps, the most important preparation of mercury, both from the certainty of its operation, its mildness, combined at the same time with sufficient activity, and the numerous indications it is capable of fulfilling. The process, by which it is obtained, too, is one that fortunately is little liable to be varied by circumstances, but affords an uniform product.

The ultimate result of the process, is to bring a quantity of metallic mercury into combination with the principles of the corrosive muriate. In the corrosive muriate, the metal exists in a high state of oxidation, and this oxide is combined with a considerable proportion of muriatic acid. The additional proportion of quicksilver, triturated with it, appears to be quickly oxidated, for it soon loses its metallic form, and the whole is converted into a grey powder. By the application of the heat, which is necessary to produce sublimation, the combination is rendered complete; the quicksilver which is added, shares the oxygen of the oxide in the corrosive muriate, and the whole oxide, thus formed, combines with the muriatic acid which the corrosive muriate contained. It is a general law, with regard to the combinations of acids with metallic oxides, that when the metal is highly oxidated, more acid is required to produce saturation, than when it is in a lower state of oxidation. Hence, if the degree of oxidation in any saline metallic compound be reduced, less acid will be necessary to the constitution of the new compound in the neutral state, and this is well displayed in the present combination; for, although the quantity of base is increased, relatively to the acid, yet as this base is also brought into a lower state of oxidation, the portion of acid appears to be sufficient to produce saturation in the new compound; it gives no indication of being a sub-salt, has no tendency to combine with a larger quantity of acid, nor apparently any power of neutralizing any additional proportion; it is of determinate composition, and is obtained in a crystalline form.

The product then of this process is a muriate of mercury, in which the metal is in a low state of oxidation, and in which this oxide is combined with no large quantity of muriatic acid. Of course, it differs from the corrosive muriate in the lower degree of oxidation of its base, and in that base being combined with less acid.

This is not inferred merely from the nature of the process by which it is formed, though it is sufficiently established by this; but it is likewise confirmed by its analysis. Mr Chenevix determined the proportions of its constituent principles, by the same series of experiments by which he investigated the composition of the corrosive muriate. The oxide which is its base, he concluded, is composed of 89.3 of quicksilver, and 10.7 of oxygen; and in 100 parts of it, 88.5 of this oxide are combined with 11.5 of muriatic acid. Its ultimate principles, therefore, are 11.5 of acid, 9.5 of oxygen, and 79 of quicksilver;—proportions of oxygen and acid considerably less than what, according to the experiments of the same chemist, enter into the composition of corrosive muriate of mercury. It has already been stated, that the subsequent experiments of another chemist, Zaboada, afford the result, that less oxygen exists in the composition of the oxide, which is the base of the corrosive muriate, than what is assigned by Chenevix; and the same experiments afford a similar result with regard to the oxide which is the base of the mild muriate; but still they establish the same general difference between these two salts,—that in the mild muriate, or sub-muriate as it is named, the metal is less highly oxidated, and the oxide is combined with an inferior proportion of muriatic acid. According to Zaboada, the oxide in the mild muriate contains little more than 5 of oxygen in 100 parts, and the salt itself is composed of 89.4 of this oxide, with 10.6 of muriatic acid. Its ultimate principles are 10.6 of acid, 4.4 of oxygen, and 85 of quicksilver. If the analysis of the two preparations are correct, more metallic quicksilver is employed than is necessary to convert the corrosive into the mild muriate.

According to the hypothesis, in which oxymuriatic acid is regarded as a simple substance, calomel is a compound of it with metallic quicksilver, containing less of the former, or chlorine, than corrosive sublimate does; the proportion of it in calomel being to that in corrosive sublimate as 1 to 2, the quantity of mercury being the same in both.

I have already pointed out the impropriety of the name given by the Colleges to this preparation, that of Sub-muriate. The compound is not, as the name, according to the principles of chemical nomenclature implies, a Sub-Salt; nor is its relation to the other salt, named Muriate of Mercury, such, that it can by any addition of acid be converted into it. As a medical nomenclature, it is still more objectionable, and the introduction of it is to be regretted,—the merely prefixing the syllable *sub* not being sufficient to guard effectually against the dangerous mistake of confounding it with the other, from which it differs so widely. The name, Mild Muriate of Mercury, is under both points of view preferable, as has been already explained; though it will always be safer to prescribe it by the arbitrary name of Calomel, by which it has been long known.

The combination, whence the mild muriate of mercury is formed, is scarcely complete at the first sublimation; a portion of the quicksilver rises on the first application of the heat, and adheres to the portion of muriate condensed on the sides of the vessel in minute globules; and a small quantity of unchanged corrosive muriate appears also to be diffused through the mass. The white powder mentioned in the formula of the Edinburgh Pharmacopœia, as collected in the neck of the matrass, is principally corrosive muriate, and is to be rejected; the red powder is oxide of iron, which, when the corrosive muriate is prepared by the medium of sulphate of iron, is diffused through it in minute quantity, but which will not be present when the corrosive muriate is prepared, as is now directed, from sulphate of mercury. To render the combination complete, the sublimed mass is reduced to powder, and is sublimed a second time. The London College order even a third sublimation, and the practice formerly was to sublime it six or seven times. This is, however, altogether unnecessary; and it has even been ascertained, that at each sublimation a little corrosive muriate is reproduced. After the second sublimation, any globules of quicksilver that may adhere to the mass are removed; it is reduced to a fine powder by trituration and levigation with water, and is well washed with water, until the water pass off tasteless, and according to the test given by the Dublin College, until it give no indications of precipitation, from adding a few drops of a solution of carbonate of potash. A method has been introduced by Mr Howard, of conducting the sublimation in an apparatus, so constructed, that the vapours are not condensed in the upper part of the vessel, forming a solid mass, but are condensed on the surface of water. The aggregation, whence a certain degree of ductility and hardness arises that renders difficult the levigation of the sublimate, is thus obviated; it is obtained at once, in the state of a fine powder, and any corrosive muriate that may rise with it is abstracted.

Mild muriate of mercury in its common form is in a dense cake, which is evidently an aggregate of short prisms; and when formed, in particular, by slow sublimation, these are very conspicuous. It is semi-transparent, has a slight yellowish colour, which is liable to be darkened by light, is somewhat ductile and very heavy, its specific gravity being 7.2. It is less volatile than the corrosive muriate; it appears to be altogether insoluble in water; at least Rouelle has stated, that above 1000 parts of water are required for its solution. When pure, it is perfectly insipid.

As a mercurial, this preparation is extensively employed, its operation being sufficiently mild, and, at the same time, certain and active, and its use is only limited by the tendency which it has to occasion purging. As a remedy in syphilis, it is given in the dose of a grain night and morning, its determination to the intestines being prevented, if necessary, by the addition of a little opium. It is the preparation which is most usually given in the other diseases in which mercury is employed. It is thus administered in affections of the liver or neighbouring organs, in which advantage appears to be derived, both from its local determination and its purgative operation; in some forms of inflammatory diseases, particularly chronic rheumatism and croup, in which its beneficial effects appear to arise both from its purgative effect and from its general action on the system; in dysentery, in which its successful application appears to depend partly on its operation as a cathartic, and partly as a mercurial; in various forms of febrile affection, particularly the fevers of warm climates, in which this combined operation of it is not less advantageous; in cutaneous diseases, in which it appears to operate simply as a mercurial alterative; in various diseases belonging to the class Neuroses, particularly tetanus and hydrophobia, in which it affords the most speedy mode of establishing the general action of mercury on the system; and in hydrocephalus, where it is probably farther advantageous by increasing absorption. It is in common use as a cathartic, either by itself in a dose from five to ten grains, or in a smaller quantity to promote the operation of other purgatives. Its anthelmintic power is justly celebrated. And it is superior to the other mercurials in assisting the operation of diuretics in dropsy. From its great specific gravity, it ought always to be given in the form of bolus or pill.

SUB-MURIAS HYDRARGYRI PRÆCIPITATUS. Precipitated Submuriate of Mercury.

Take of Diluted Nitrous Acid, Purified Quicksilver, of each eight ounces; Muriate of Soda, four ounces and a half; Boiling Water, eight pounds. Mix the quicksilver with the diluted nitrous acid; and, towards the end of the effervescence, digest with a gentle heat, shaking the vessel frequently. It is necessary, however, that more quicksilver should be mixed with the acid than this can dissolve, that the solution may be obtained fully saturated. Dissolve at the same time the muriate of soda in the boiling water: pour the other solution on this while warm, and mix them quickly together. After the precipitate subsides, pour off the saline liquor, and wash the sub-muriate of mercury, by frequently adding warm water, pouring it off after each time the precipitate subsides, until it come off tasteless.

SUB-MURIAS HYDRARGYRI PRÆCIPITATUM. Precipitated Submuriate of Quicksilver. Dub.

Take of Purified Quicksilver, seven ounces; Diluted Nitrous Acid, five ounces. Pour the acid on the quicksilver in a glass vessel, and when the mixture first ceases to effervesce, digest with a moderate heat for six hours, agitating occasionally; then increase the heat, so that the liquor boil a little; pour it off from the remaining mercury, and mix it quickly with ten pounds of boiling water, in which four ounces of muriate of soda have been previously dissolved; wash the powder which is precipitated with warm distilled water, as long as the liquor poured off affords any precipitate on the addition of a few drops of water of sub-carbonate of potash; lastly, dry it.

The design of this process is to obtain mild muriate of mercury, the muriatic acid of the muriate of soda combining with the oxide of mercury, and forming this compound, while the nitric acid of the mercurial solution is saturated by the soda; and the advantages supposed to belong to it are, that it is more easily executed, less expensive, and affords the product in a much finer powder than that obtained by sublimation can be reduced to. It was introduced on the authority of Scheele, and the directions which are given are those which he pointed out. The theory of metallic solutions was, however, in his time imperfectly understood, and the process to afford the proper product ought to be conducted in a very different manner from that ordered in the Pharmacopœias.

Scheele was evidently misled by the analogy of the increase of solubility of a salt in water by increase of heat; hence, by aiding the action of the acid on the quicksilver by heat, it appeared to follow, that a larger product would be obtained, and that the acid being thoroughly saturated, the product would be more mild. Two circumstances, however, operate in this case, and give rise to other results, which defeat the intention of the process, and have always rendered its success very imperfect.

1st, By digesting or boiling the acid on the metal, the decomposition of the acid is facilitated, and the mercury passes to a more highly oxidated state; hence, when the solution is added to the solution of muriate of soda, the degree of oxidation being too great to admit of the whole being converted into mild muriate, a portion of corrosive muriate is always formed. It has been observed, indeed, that although in the first stage of the solution much nitric oxide gas is disengaged, indicating a decomposition of the acid to a considerable extent, yet, that after this, an additional portion of quicksilver is dissolved without much effervescence, whence it has been concluded by some chemists, that this portion must receive oxygen from the portion already dissolved, and that the whole therefore still exists in a low state of oxidation. The degree of oxidation may perhaps be so far reduced in this manner, but the fact is, that the mercury, in the solution thus prepared, is still too highly oxidated to be converted entirely into a mild muriate when combined with muriatic acid; a portion of it is always converted into corrosive muriate, and with a solution so prepared, less muriate of mercury is obtained from a given weight of quicksilver, than from a solution prepared entirely in the cold. I have ascertained this by experiment, the quantity of mild muriate obtained from a solution of one ounce of quicksilver in diluted nitric acid in the cold being a little more than an ounce, while, from the same quantity dissolved with the application of heat, the precipitate did not much exceed half an ounce, while the liquor held dissolved much more corrosive muriate than the other.

2dly, When the solution of the quicksilver in the acid is promoted by heat, the acid is so completely saturated with oxide, that the solution is partially decomposed by mere dilution with water, a quantity of sub-nitrate of mercury being precipitated. Hence, when such a solution is mingled with the solution of muriate of soda, this decomposition will take place to a certain extent, from the operation of the water of the solution, and a quantity of this sub-nitrate must be mixed with the mild muriate, and must so far modify its powers.

These sources of error are obviated by using a solution of mercury prepared in the cold, and with a diluted acid; and from such a solution carefully prepared, the product, I have found, is almost entirely mild muriate, with very little corrosive muriate. The method of conducting the process is the following: Add the quicksilver in small portions at a time to the nitric acid previously diluted with one part and a half of water, (observing the proportions given in the Edinburgh Pharmacopœia), and avoid altogether the application of heat; when the solution is completed, or no more mercury appears to be capable of being dissolved, add a little water to dissolve any part of the nitrate of mercury that may have crystallized; then pour off the clear solution from the undissolved quicksilver, and add it to the solution of muriate of soda. The precipitate having subsided, is to be carefully washed with water, repeatedly poured on it, to carry off the small quantity of corrosive muriate that is formed. Mild muriate of mercury will thus be obtained. Berthollet has affirmed, however, that even as prepared from a solution of this kind, the precipitate retains in combination a portion of nitric acid, probably owing to the circumstance that such a solution must always have an excess of acid, part of which the precipitate, as it is formed, may attract. The process ought, on every account, perhaps to be expunged from the Pharmacopœias. It has no advantage; for it is not, as has been supposed, more economical. The fineness of the powder is of little importance, for by levigation the sublimed muriate is obtained sufficiently fine for medicinal use; and the process by sublimation gives a product perfectly uniform, while that by precipitation must always be liable to some uncertainty, from being so much influenced by the manner in which it is conducted. If it is ever followed, much attention should be paid to washing the precipitate thoroughly, so that not the most minute portion of the corrosive muriate may remain mixed with it.

The precipitated mild muriate of mercury is in the state of a smooth powder, whiter, and of much less specific gravity than the muriate prepared by sublimation, differences probably depending on its state of aggregation. When pure, its medicinal operation must be the same. It has been said, from trials that have been made of it, to be more liable to occasion purging. If this difference exists, it is probably owing to the presence either of sub-nitrate of mercury, or of a minute quantity of corrosive muriate.

OXIDUM HYDRARGYRI CINEREUM. Ash-coloured Oxide of Quicksilver. Ed.

Take of Purified Quicksilver, four parts; Diluted Nitrous Acid, five parts; Distilled Water, fifteen parts; Water of Carbonate of Ammonia, as much as may be sufficient. Dissolve the quicksilver in the acid. Add gradually the distilled water. Then pour on as much of the water of carbonate of ammonia as may be sufficient to precipitate the oxide of quicksilver, which is to be afterwards washed with pure water and dried.

PULVIS HYDRARGYRI CINEREUS. Ash-coloured Powder of Quicksilver. Dub.

Take of Quicksilver, two ounces; Diluted Nitrous Acid, two ounces by measure. Dissolve the quicksilver in the acid with a low heat, and dilute the solution with eight ounces of cold distilled water; drop into it of water of carbonate of ammonia an ounce and a half, or as much as may be sufficient to throw down the precipitate, which wash with warm distilled water, until the liquor poured off yields no precipitate on dropping in a few drops of water of sulphuret of ammonia; lastly, dry it.

These two processes are essentially the same. A preparation is inserted in the London Pharmacopœia under the same name, but the process for preparing it is quite different, and probably gives a different product. It is therefore to be considered by itself.

The action of ammonia on metallic salts is not perfectly similar to that of the other alkalis. It has a greater tendency to unite with the oxide and a portion of the [acid, so as to form ternary combinations, and from its hydrogen attracting oxygen, it sometimes changes the constitution of the metallic oxide. These actions appear to be modified by the state of oxidation of the metallic salt, and this is well displayed in the effects it produces in the present process on the nitrate of mercury.

If the nitrous mercurial solution is in that state in which the metal is highly oxidated, on adding the ammonia, a precipitate is thrown down perfectly white. This was found by Fourcroy to consist of the oxide of mercury, in combination with a portion of acid and of ammonia, its composition, as he determined it, being 68.2 of oxide, 16 of ammonia, and 15.8 of nitric acid. But if the solution contain the metal in a low state of oxidation, the precipitate which is formed is of a dark blue colour approaching to black. This has been supposed to be merely the oxide of mercury that had been combined with the nitric acid, the ammonia combining with the acid, and precipitating the oxide. But an obvious objection to this opinion is, that the precipitate is not the same as that thrown down by potash or soda, but is of a more uniform colour, and darker, a proof that ammonia exerts some peculiar action in its production. According to Fourcroy, who investigated with considerable care these and other saline mercurial combinations, the ammonia, in precipitating the oxide from its combination with the acid, partially de-oxidates it, the hydrogen of a portion of the ammonia attracting part of the oxygen of the oxide, and reducing it to a still lower state of oxidation, approaching nearly indeed to the metallic state: hence, as he affirmed, there is at the same time a disengagement of a portion of nitrogen gas in consequence of this decomposition of a part of the ammonia.

In frequently performing this process, it has appeared to me that this peculiarity of action by ammonia is exerted only when the mercurial solution contains the metal in a state of oxidation intermediate between the *minimum* and *maximum*. If care has been taken in preparing the solution, so as to have it with the metal dissolved at a very low degree of oxidation, the precipitate thrown down by potash is as dark in its colour as that by ammonia. But if it be somewhat more highly oxidated, that from ammonia is of a much darker colour, and there appears even a film on the surface, with a lustre approaching to metallic. The theory given by Fourcroy, of the operation of the ammonia, is therefore probably just, though I must add, that any effervescence indicating the disengagement of nitrogen gas is extremely slight, and on a small scale is scarcely apparent.

Some chemists have supposed, that the dark grey precipitate contains ammonia. When the precipitate, however, is properly prepared, and thoroughly washed, I have not been able to discover any trace of ammonia in it: when mixed with lime, or with a fixed alkali, no ammonia is exhaled even when heat is applied. If the solution, however, from which the precipitate has been thrown down, has been that in which the metal has been highly oxidated, part of the white triple compound described by Fourcroy will have been formed, and will mix with the dark coloured precipitate, and in this case a portion of ammonia is detected. In decomposing mercurial solutions accordingly in this state, the precipitate at different stages of the precipitation is various in its colour, being at first grey, and afterwards lighter, and being more or less light as the solution contains the metal more highly oxidated, evidently from the predominance of the white precipitate. But any ammonia derived from this source is foreign to what properly constitutes the grey precipitate.

From the circumstances which influence this preparation not having been fully understood, it has been supposed difficult to obtain it uniform; nor are the directions in the Pharmacopœias sufficiently precise; and the direction in the Dublin Pharmacopœia of applying heat, even though gentle to favour the solution, is improper. If the process be properly performed, it may be obtained with certainty always the same, and it forms one of the best of the mercurial preparations for internal use. The nitrous acid ought to be diluted with rather more than an equal weight of water, so as to act on the quicksilver slowly, and with scarcely any sensible effervescence; the quicksilver should be added in small quantities at a time, and in as large a quantity ultimately as the acid can dissolve without the application of heat. When the solution appears to have ceased, the liquor is to be poured off from the undissolved quicksilver, and strained; it is to be diluted cautiously with water, as far as the dilution can be carried without impairing its transparency; and water of ammonia is to be added as long as any precipitation is produced. The precipitate prepared in this way is of a very deep grey colour, approaching to black; it is to be washed well with water, and dried. In drying, from exposure to the air and light, its colour becomes lighter; still it is a blue grey. In the shops it is usually of a light grey colour, and sometimes almost perfectly white, from the solution of mercury from which it has been precipitated containing the metal in too highly an oxidated state. Both Colleges order carbonate of ammonia to be employed in the precipitation; and it might be supposed from this, that the oxide thrown down will receive carbonic acid, and that the precipitate will be a carbonate or sub-carbonate. This, however, is not the case; the carbonic acid is disengaged, and the same precipitate is thrown down by pure ammonia. It has been supposed, that the precipitate is produced with more certainty of a dark colour, when the ammonia is added in the state of carbonate; but this is a mistake, the darkness of the colour depending entirely on the degree of oxidation of the metal.

The Grey Oxide of Mercury has been introduced as a substitute for those preparations in which the metal is oxidated by trituration under exposure to the air, and has been supposed to have the advantage of more uniformity of strength, as the others are liable to be variable from imperfect preparation. When properly prepared, it appears to be the same in chemical composition, and the medicinal operation of it is also extremely similar. It is given in the dose of a grain night and morning, usually under the form of pill, and this answers very well as a substitute for the Mercurial Pill. An ointment formed from it, Unguentum Oxidi Hydrargyri Cinerei, has been introduced into the Edinburgh Pharmacopœia; one part of the grey oxide being mixed with three parts of lard. This is designed as a substitute for the Mercurial Ointment, but it has been said not to be so easily forced through the cuticle by friction. It has also been used in the state of vapour from the application of heat, for fumigating venereal ulcers.

HYDRARGYRI OXYDUM CINEREUM. Ash-Coloured Oxyd of Quicksilver. Lond.

Take of Sub-muriate of Quicksilver, an ounce; of Liquor of Lime, a gallon. Boil the sub-muriate of mercury in the liquor of lime, stirring it constantly, until the ash-coloured oxyd of mercury fall down. Wash this with distilled water, and dry it.

This process has been had recourse to, from the supposed difficulty of obtaining the grey oxide, by precipitation from nitrate of mercury by ammonia, uniform. It will afford a preparation sufficiently uniform, and so far similar to the other, that the oxide is in a low state of oxidation, the oxide existing in that state in the mild muriate. The lime by its affinity to the muriatic acid may abstract the greater part of it, but can scarcely be supposed to abstract the whole, and the product is probably, therefore, what is in strictness of nomenclature, a submuriate of mercury.

Oxidum hydrargyri rubrum per acidum nitricum, *olim Mercurius Præcipitatus Ruber.* Red Oxide of Quicksilver by Nitric Acid. Ed.

Take of Purified Quicksilver, one pound; Diluted Nitrous Acid, sixteen ounces. Dissolve the quicksilver, and evaporate the solution with a gentle fire to a white dry mass, which being reduced to powder, is to be put into a glass cucurbit, a thick glass plate being put over its surface. Then a capital being adapted, and the vessel placed in sand, apply to it a fire gradually raised, until it pass into very red small scales.

Hydrargyri nitrico-oxidum. Nitric Oxide of Quicksilver. Lond.

Take of Purified Quicksilver, three pounds; Nitric Acid, a pound and a half; Distilled Water, two pints. Mix them in a glass vessel, and boil until the quicksilver is dissolved, and the water being evaporated, a white matter remains. Rub this into powder, and put it into another vessel as shallow as possible; then apply a gentle heat, and gradually increase it, until any red vapour cease to be produced.

Oxydum hydrargyri nitricum. Nitric Oxide of Quicksilver. Dub.

Take of Purified Quicksilver, ten ounces; Diluted Nitrous Acid, ten ounces by measure. Mix them in a glass vessel, and with a heat gradually raised, dissolve the quicksilver; then raise the fire, until the residual matter in the bottom of the vessel pass into red scales.

The quicksilver is in this preparation first oxidated by the nitrous acid, and the oxide then combines with the remaining acid. By the increase of heat, this nitrate is decomposed, and the greater part of the acid expelled, leaving a mass of a deep red colour. From the name of oxide given to this preparation, it appears to be supposed, that the whole acid of the nitrate is expelled or decomposed, and that the residual matter is quicksilver combined with oxygen alone. This has not been established, however, by any accurate analysis of the preparation, and there are very obvious objections to it. Though a red oxide of mercury can be formed by the action of atmospheric air on the metal at a high temperature, it is quite different in its appearance from the product of the present process: and the latter is possessed of a considerable degree of escharotic power not belonging to the former, communicated probably by a portion of nitric acid combined with it. In cases where a volatile ingredient is expelled from one more fixed by the application of heat, the decomposition is scarcely ever complete, the influence of quantity operating, and causing a portion of the volatile ingredient to be retained, the quantity being greater as there is less difference in the volatility of the two substances. It follows from this, as the most probable conclusion, that although the greater part of the nitric acid may be expelled from the oxide of mercury, a portion of it will be retained, and it is probably impossible to expel the whole of it, without raising the heat to that point at which the oxygen itself will be expelled, and the quicksilver be reduced to the metallic form. I have accordingly found, that it does contain nitric acid. If the preparation be boiled for a short time with five or six times its weight of water, the liquor, when filtered, has the styptic metallic taste, and gives a white precipitate with water of ammonia, or with carbonate of potash,—a plain proof that it holds dissolved nitrate of mercury; and to avoid any fallacy, the preparation submitted to experiment was that found in the shops, the product of the process on the large scale, of a bright red colour, and more perfectly prepared than that formed on the small scale. This must therefore be regarded as a sub-nitrate, and the proper appellation to be given to it is, Sub-nitras Hydrargyri Ruber, by which also it will be better distinguished from the proper red oxide. According to Paysse, 100 parts decomposed by heat afford 82 of mercury, and 18 of oxygen; this oxygen probably having an intermixture of nitrogen from the decomposition of the acid. The proper red oxide affords only 007 of oxygen.

It has always been found very difficult to conduct this process, so as to obtain the product of that bright red colour and scaly appearance which are regarded as tests of its proper preparation; and some of the steps in the operation, as directed by the Edinburgh College, are designed to attain this more perfectly. Much of the success depends apparently on the scale on which it is formed, the heat acting more steadily, and with more uniformity, on a large, than on a small quantity. When properly prepared, it is in scales of a bright red colour. It is so acrid as to be altogether unfit for internal administration. Externally it is employed as an escharotic, being applied either in a finely levigated powder, or mixed with lard in the form of ointment. This ointment, composed of one part with eight of lard, is officinal in the Edinburgh Pharmacopœia.

SUB-SULPHAS HYDRARGYRI FLAVUS, *olim Turpethum Minerale.* Yellow Sub-sulphate of Quicksilver. Ed.

Take of Purified Quicksilver, four ounces; Sulphuric Acid, six ounces. Put them into a glass cucurbit, and boil in a sand-bath to dryness. The white matter remaining at the bottom of the vessel being reduced to powder, is to be thrown into boiling water. It will thus be converted into a yellow powder, which must be frequently washed with warm water.

OXYDUM HYDRARGYRI SULPHURICUM. Sulphuric Oxide of Quicksilver. Dub.

Take of Purified Quicksilver, one pound; Sulphuric Acid, a pound and a half. Dissolve with a heat sufficiently strong in a glass vessel, and increase the heat until the matter become quite dry. On pouring upon it a large quantity of warm water, it becomes yellow and falls into powder, which is to be rubbed with this water carefully in an earthen mortar. After pouring off the fluid above, wash the powder repeatedly with warm distilled water, as long as the decanted fluid gives any precipitate on the addition of a few drops of water of sub-carbonate of potash; lastly, dry it.

By boiling sulphuric acid on quicksilver, the acid suffers a partial decomposition, a portion of its oxygen is communicated to the metal, and sulphurous acid gas is disengaged. The oxide of quicksilver combines with the remaining acid, forming super-sulphate of mercury. By the continuance of the heat, this is partially decomposed, much of the acid is expelled, and a sub-sulphate of mercury remains. On this, boiling water is poured; and it acts as water does on many of the metallic salts. Having a stronger affinity to their acid than to their base, it decomposes the salt, abstracting the acid, and precipitating the oxide; but the influence of quantity on chemical affinity still so far operates in this decomposition, that the acid in combining with the water retains a portion of the oxide combined with it, and the oxide precipitated retains a portion of the acid. The entire compound, therefore, is resolved into a super-salt, which is dissolved, and a sub-salt which is thrown down. This happens in the present process; the water poured on the sulphate of mercury abstracts the acid, retaining in combination with it a portion of oxide, and forming therefore a super-sulphate of mercury, which remains dissolved, while a sub-sulphate is precipitated, and forms the yellow powder. The colour of this is more lively when hot water is used in its preparation, probably from the temperature favouring the chemical action of the water. The success of the process, with regard to the quantity of product, depends much on the sulphate of mercury having been deprived of all free acid previous to the affusion of the water; for if it contain much acid, the greater part of the salt is dissolved without being decomposed. The proportion of acid ordered in the Pharmacopœia is unnecessarily large, and rather defeats the object of the process; an equal weight is sufficient, and the heat ought to be applied to the saline mass until it is perfectly dry. The super-sulphate which is dissolved in the water may be decomposed by potash, and a sub-sulphate precipitated.

Yellow sub-sulphate of mercury must, from the nature of the process by which it is obtained, be liable to variation in the proportions of its constituent principles. According to Fourcroy, it consists of 76 of mercury, 11 of oxygen, and 10 of acid, with 3 of water, while another analysis gives the proportion of acid at 15. As a medicine, it is too harsh in its operation to be administered internally, being liable to produce violent vomiting. It has sometimes, however, been given as a powerful emetic, in a dose of five grains. It is an errhine, and has been employed as such, mixed with any mild vegetable powder, in some affections of the eyes.

SULPHURETUM HYDRARGYRI NIGRUM, *olim Æthiops Mineralis.* Black Sulphuret of Quicksilver. Ed.

Take of Purified Quicksilver, Sublimed Sulphur, of each equal weights. Rub them together in a glass mortar with a glass pestle, until the globules of quicksilver entirely disappear. It may be made likewise with a double proportion of quicksilver.

SULPHURETUM HYDRARGYRI NIGRUM. Black Sulphuret of Quicksilver.

Take of Purified Quicksilver, Sublimed Sulphur, equal weights. Rub them together in an earthen mortar, until the globules disappear.

By the trituration a chemical combination appears to be effected between the quicksilver and sulphur, as the former loses completely its metallic form, and no globules can be perceived in the powder by the microscope. It has even been supposed, that the metal is at the same time imperfectly oxidated, and combined with sulphuretted hydrogen; but from the researches of Seguin, this does not appear to be the case. The combination is much facilitated by the application of heat, and it can at once be effected, by adding the quicksilver to the melted sulphur.

This is the least active of the mercurial preparations. As an anthelmintic it is sometimes given in a dose of five or ten grains, and it has been used as an alterative.

SOME additional preparations of mercury have a place in the London and Dublin Pharmacopœias, and are used in practice.

HYDRARGYRUS CUM CRETA. Quicksilver with Chalk. Lond.

Take of Purified Quicksilver, three ounces; Prepared Chalk, five ounces. Rub them together until the globules no longer appear.

**HYDRARGYRUM CUM CRETA.** Quicksilver with Chalk. Dub.

Prepare this in the same manner as Quicksilver with Magnesia, *(described in the next formula)*, substituting only Chalk for Magnesia.

Quicksilver, when triturated with any substance which aids the division of its globules, and extends their surface, appears to be susceptible of oxidation from the action of the atmospheric air, and the grey oxide formed by this operation is the basis of the common mercurial pill, as well as of some other preparations. More than one preparation of this kind, however, for internal administration, is superfluous; and the mercurial pill, prepared by trituration of the quicksilver with honey, manna, or mucilage, being that which has been long established in practice, is to be preferred. The present preparation has nothing peculiar to recommend it.

**HYDRARGYRUM CUM MAGNESIA.** Quicksilver with Magnesia. Dub.

Take of Quicksilver, Manna, each one ounce; Magnesia, half an ounce. Triturate the quicksilver with the manna in an earthen mortar, adding a few drops of water to give to the mixture the consistence of syrup, and continuing the trituration until the mercurial globules entirely disappear. Then add to the mixture a drachm of the magnesia, triturating it constantly. The whole being well mixed together, add a pint of hot water, and shake the mixture; allow the liquor to rest, and as soon as the sediment subsides, pour it off. Repeat this washing a second and third time, that the manna may be entirely removed; and while the sediment is still humid, add to it the remaining magnesia. Lastly, dry the powder on bibulous paper.

The object of this process is to obtain the oxidation of the mercury by trituration, and the interposition of the soft viscous matter of the manna with the addition of the water may facilitate this; the subsequent steps of the operation are designed to remove the manna, and obtain the grey oxide mixed with the magnesia. The same observation applies, however, to this as the preceding preparation,—that it is superfluous, and that for any useful purpose the mercurial pill will answer equally well. The only advantage, at least, of either process, is, that it may afford a mild preparation that can be given under the form of bolus, where a pill cannot be easily swallowed.

HYDRARGYRI OXYDUM RUBRUM. Red Oxide of Quicksilver. Lond.

Take of Purified Quicksilver, one pound. Put the quicksilver into a glass vessel, with a narrow mouth, and broad at the bottom. Apply heat to this open vessel, raised to the six-hundredth degree, until the quicksilver pass into red scales; then rub these into a fine powder.

OXYDUM HYDRARGYRI. Oxide of Quicksilver. Dub.

Take of Purified Quicksilver, any quantity. Let it be put into an open glass vessel, with a narrow mouth, and broad bottom, and expose it to a heat of about 600°, until it is converted into red scales.

At the temperature at which quicksilver boils it combines with oxygen; and when heated to this temperature, under exposure to the air, red scales gradually form on its surface from this combination. There is a difficulty, however, in conducting the process; for if the quicksilver be freely exposed to the air, a considerable quantity of it is lost, from its vapour being dissipated, especially if the heat be raised a little too high; while, on the other hand, if the air is not freely admitted, the oxidation cannot proceed. The method directed in the formula of the Colleges is the most effectual,—employing a glass vessel broad at the bottom, (so as to present the quicksilver under an extensive surface), and with a long neck, drawn out to a small aperture, so that while the atmospheric air is admitted, the mercurial vapour will not so easily escape, the heat being applied by the medium of sand. Still the oxidation goes on very slowly, requiring the application of the heat for several weeks; and from the necessity of keeping up a steady heat without allowing it to become too strong, the conducting of the process requires considerable attention, and the preparation is comparatively high priced.

Red oxide of quicksilver is in scales of a dark brick red colour. When exposed to the heat of ignition it is decomposed, gives out oxygen, and the quicksilver returns to its metallic form. From the quantity of oxygen obtained by this reduction, Lavoisier inferred that the oxide contains seven parts of oxygen in 100 parts; the proportion is probably rather larger. It is a dangerous mistake which some have made, the supposing the red scaly substance obtained from the decomposition of nitrate of mercury by heat to be essentially the same. The latter is much more acrid, and cannot be given internally with safety; and it is to be regretted, that the name of Oxide has been given to it, as it may sometimes lead to its substitution for the present preparation.

The red oxide prepared by heat, Calcined Mercury as it was formerly named, is a very active mercurial. It has also been regarded as certain and permanent in its operation, and has therefore sometimes been employed in the treatment of the secondary symptoms of syphilis, where the milder mercurials had failed. Its dose is one grain. It is liable, however, to produce irritation in the stomach or intestines, and from this, as well as from its high price, is not very frequently used.

HYDRARGYRUS PRÆCIPITATUS ALBUS. White Precipitate of Quicksilver. Lond.

Take of Oxymuriate of Quicksilver, Muriate of Ammonia, each half a pound; Liquor of Sub-Carbonate of Potash, half a pint; Distilled Water, four pints. First dissolve the muriate of ammonia, then the oxymuriate of mercury in the distilled water, and add to these the liquor of sub-carbonate of potash; wash the powder which is precipitated, until it is free from taste; then dry it.

SUB-MURIAS HYDRARGYRI AMMONIATUM. Ammoniated Sub-Muriate of Quicksilver. Dub.

To the liquor which has been poured off from the precipitated sub-muriate of mercury, add as much water of ammonia as is sufficient to precipitate the metallic salt. Wash the precipitate with cold distilled water, and dry it on bibulous paper.

Though these two processes are apparently very different, they afford the same product. When corrosive muriate of mercury is decomposed by ammonia, a white precipitate is thrown down, consisting of the oxide of the muriate, with portions both of acid and of ammonia combined with it; the proportions, according to Fourcroy's analysis of it, being 81 of oxide, 16 of muriatic acid, and 3 of ammonia. It is this precipitate which is formed in both processes. In the first, it may be conceived, that the potash of the sub-carbonate of potash decomposes the muriate of ammonia, by combining with the muriatic acid, and that the ammonia evolved from this decomposes the muriate of mercury, throwing down the white precipitate the same as when ammonia is added directly to a solution of corrosive muriate; or, what affords a more simple, and perhaps a more just view, the potash attracts the greater part of the acid, both of the muriate of mercury and muriate of ammonia, and the oxide of mercury is precipitated, retaining a portion of the acid combined with it, and having attracted the quantity of ammonia necessary to the constitution of the ternary compound. Half the quantity, however, of muriate of ammonia, that is ordered by the London College, is sufficient for this purpose. The other process, that in the Dublin Pharmacopœia, is simply the decomposition of corrosive muriate of mercury by ammonia. In the preparation of the mild muriate of mercury by precipitation, it has already been stated, that if a solution of mercury in nitric acid be used, which has been prepared with the application of heat, and which therefore contains the metal more highly oxidated than the *minimum*, a portion of corrosive muriate of mercury is formed, when the solution is decomposed by muriate of soda. It is such a mercurial solution that is ordered in the Dublin Pharmacopœia for the preparation of the precipitated submuriate, and hence the liquor from which the precipitate subsides holds corrosive muriate dissolved. When decomposed, therefore, by ammonia, as directed by the present formula, it affords the ternary white precipitate. The name given to this preparation by the Dublin College is preferable to that in the London Pharmacopœia, which is altogether vague. Sub-Murias Hydrargyri et Ammoniæ is the correct appellation. The necessity of the presence of ammonia to its constitution is very well shewn from the fact, that, if the corrosive muriate be decomposed by potash, it is a yellow precipitate that is thrown down; when the white precipitate is decomposed by heat, ammonia and nitrogen are evolved.

This precipitate, when dried, forms a light white powder, which is tasteless and insoluble in water. It is used only externally, generally under the form of ointment, in some cutaneous affections.

HYDRARGYRI SULPHURETUM RUBRUM. Red Sulphuret of Quicksilver. Lond.

Take of Purified Quicksilver, forty ounces; Sublimed Sulphur, eight ounces. To the sulphur melted over the fire, add the quicksilver, and as soon as the mass swells, remove the vessel from the fire, and cover it closely, that inflammation may not take place; then rub it into powder, and sublime.

SULPHURETUM HYDRARGYRI RUBRUM. Red Sulphuret of Quicksilver. Dub.

Take of Purified Quicksilver, forty ounces; Sublimed Sulphur, eight ounces. Mix the quicksilver with the sulphur melted, and if the mixture inflame, extinguish the flame by covering the vessel; then let the matter rubbed to powder be sublimed.

The inflammation which is taken notice of, as liable to happen when the melted sulphur and quicksilver are mingled together, is not a real combustion, but the evolution of heat and light from their mutual action; this taking place in other cases of the combination of sulphur with metals, and being wholly unconnected with any agency of the air. The covering of the vessel will therefore not check it, though the removal of it from the fire may do so, by reducing the temperature, and thus suspending the mutual action of the mercury and sulphur. If this should happen, the combination will probably therefore remain imperfect, and the process may succeed less perfectly, or at least succeed only from the action being renewed in the subsequent sublimation. The exclusion of the air must, however, be proper, as preventing a real combustion taking place, when the mass is so much heated. Different opinions have been maintained with regard to the nature of the ultimate product of this process. Some chemists supposed, that the mercury exists in the state of oxide, in combination with the sulphur, and Vauquelin considered the bright red colour as arising even from a high degree of oxidation; this oxygen being supposed to be combined with the metal in the first stage of the process, when the apparent combustion takes place. This oxygenation, however, has never been clearly established. And according to Proust and Seguin, the compound is a pure sulphuret, consisting of 85 or 86 of quicksilver, with 15 or 14 of sulphur.

This substance, long known by the name of Cinnabar, is of a vivid red colour, which becomes still more bright when it is reduced to powder. Its principal medicinal application is for mercurial fumigation. It is easily volatilized by heat, and its vapour, directed on the surface of venereal ulcers, checks the progress of the ulceration; and where it is of importance to do so speedily, as from the situation of an ulcer it sometimes is, the practice is employed, a little of the powder being laid on a hot iron, and the vapour directed on the part. When applied, however, in this manner to an ulcer in the throat, which is the most common application of mercurial fumigation, its sulphureous vapour proves irritating, and hence the grey oxide is sometimes preferred.

## PLUMBUM.—LEAD.

ACETIS PLUMBI, *olim Saccharum Saturni.* Acetite of Lead. Ed.

Take of White Oxide of Lead, any quantity. Put it into a cucurbit, and pour upon it ten times its weight of Distilled Acetous Acid. Let the mixture stand on warm sand until the acid become sweet; pour it off, and add a fresh quantity successively, until it cease to acquire sweetness. Then evaporate the whole liquor, freed from impurities, in a glass vessel, to the consistence of thin honey, and put it aside in a cool place, that crystals may form, which are to be dried in the shade. Evaporate the remaining liquor, that there may be a new formation of crystals, and repeat this until no more are formed.

PLUMBI SUPERACETAS. Superacetate of Lead. Lond.

Take of Carbonate of Lead, a pound; Distilled Vinegar, a gallon and a half. Boil the carbonate of lead with the acetic acid, until it is saturated, then strain through paper, and, having evaporated the water, until a pellicle appear at the surface, put it aside, that crystals may be formed. Having poured off the water, dry them on bibulous paper.

ACETAS PLUMBI. Acetate of Lead. Dub.

Take of Sub-acetate of Lead, Cerusse as it is named, any quantity; Distilled Vinegar, ten times its weight. Digest in a glass vessel until the vinegar become sweet, which being poured off, add more until it cease to acquire sweetness. Strain the liquor, and by alternate slow evaporation and cooling, form crystals, which dry in the shade.

This process is never attempted in the shops, but is conducted on a large scale, to furnish the salt for the purposes to which it is applied in the arts; distilled vinegar being either boiled on cerusse until the acid is saturated, or plates of lead being moistened with vinegar, or partially immersed in it, until they are incrusted with oxide, this oxide being dissolved by immersing the plates in the liquor, and a new quantity being formed by raising them to the surface. This is continued until the acid is saturated, and in either case the liquor is brought by evaporation to crystallize.

It is obvious, that the acetic acid of the distilled vinegar combines with the oxide of lead. The salt which crystallizes was supposed to be the neutral acetate; but it appears to be a super-acetate, and this name is accordingly given to it by the London College. The neutral acetate does not crystallize easily; and it was found by Thenard, whose attention was called to it, from this circumstance, that a slight excess of acid favours the crystallization, and that this excess of acid enters into the composition of the salt. It consists, according to the analysis of it by this chemist, of 58 oxide of lead, 26 acetic acid, and 16 of water, while the neutral salt is composed of 78 of oxide of lead, 17 acetic acid, and 5 of water.

This salt crystallizes in acicular prisms, and, as prepared on a large scale, is usually in the form of masses composed of these crystals aggregated; it is white, or of a light yellowish colour, with a silky lustre, is rather efflorescent; it has a sweet taste, whence the name of Sugar of Lead, by which it has been known, this sweetness being accompanied with a degree of astringency. It is soluble in water, requiring not more than three parts at 60° for its solution; with spring water, the solution is milky, from a partial decomposition of the salt, by the minute quantity of sulphates or muriates contained in the water; and even with distilled water the solution is not perfectly transparent, if a large quantity of the water be employed; the water, when its affinity to the acid is aided by its quantity, producing a slight partial decomposition.

Acetate, or rather super-acetate of lead, is employed principally as an external application. Its solution in water is used as a collyrium in ophthalmia, as an astringent injection in gonorrhœa, as a wash in superficial inflammation; and dissolved in vinegar, it is employed as a discutient. These applications of it have already been pointed out under its medical history.

LIQUOR PLUMBI ACETATIS. Liquor of Acetate of Lead. Lond.

Take of the Semi-vitrified Oxide of Lead (Litharge), two pounds four ounces; Acetic Acid (Distilled Vinegar), one gallon. Mix them, and boil down to six pounds, stirring constantly; then put the liquor aside, that the impurities may subside, and strain it.

LIQUOR SUB-ACETATIS LITHARGYRI. Liquor of Sub-Acetate of Litharge. Dub.

Take of Litharge, a pound; Distilled Vinegar, eight pints. Put into a glass vessel, and boil down to six pounds, stirring constantly; then pour off the liquor, after the impurities have subsided, and strain it.

This preparation was introduced by Goulard, a French surgeon, under the name of Extract of Lead, as possessed of peculiar powers, and from the confidence with which it was recommended was established in practice. It was considered by the chemists as a solution merely of oxide of lead in acetic acid, analogous to the crystallized salt. But from the examination of it by Dr Bostock, it is proved to have no excess of acid, but to consist of the neutral acetate dissolved in water, and hence the solution is largely impregnated with oxide of lead. One hundred parts of the saturated solution contain, according to his analysis, 23.1 of oxide, 5 of acetic acid, and 71.9 of water, while 100 parts of the saturated solution of the superacetate contain 16.8 of oxide, 7.5 of acid, and 75.7 of water. The distilled vinegar cannot dissolve much more than one-third of the quantity of litharge ordered in the London Pharmacopœia, and as the residue retains part of the solution mixed with it, the process by this excess of litharge is rendered unnecessarily expensive. The solution, or Goulard's extract as it is named, is of a brown colour. When kept, it becomes lighter, and deposites a quantity of oxide. It is used as a discutient, being mixed with vinegar and water, and frequently applied under the form of cataplasm. It forms also an application to inflamed surfaces, generally under the form of the following preparation, which has been admitted as officinal by the London and Dublin Colleges.

LIQUOR PLUMBI ACETATIS DILUTUS. Dilute Liquor of Acetate of Lead. Lond.

Take of Liquor of Acetate of Lead, a drachm; Distilled Water, a pint; Proof-spirit, a fluidrachm. Mix them.

LIQUOR SUBACETATIS LITHARGYRI COMPOSITUS. Compound Liquor of Sub-Acetate of Litharge. Dub.

Take of Liquor of Sub-acetate of Litharge, two drachms by weight; Distilled Water, two pints; Proof-spirit, two drachms. Mix the spirit and the sub-acetate of litharge; then add the distilled water.

This is what Goulard named absurdly Vegeto-Mineral Water, and which has been highly celebrated as an application in superficial inflammation. It is occasionally employed by surgeons, and some have thought it superior to a simple solution of acetate or super-acetate of lead.

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## ZINCUM.—ZINC.

CARBONAS ZINCI IMPURUS PRÆPARATUS, *olim Lapis Calaminaris Præparatus.* Prepared Impure Carbonate of Zinc, formerly Prepared Calamine Stone. Ed.

Procure the Impure Carbonate of Zinc roasted, from those who prepare brass, and let it be prepared in the same manner as Carbonate of Lime.

CALAMINA PRÆPARATA. Prepared Calamine. Lond.

Calcine Calamine; then rub it to powder. Lastly, reduce it to a very fine powder in the manner directed for preparing chalk.

LAPIS CALAMINARIS PRÆPARATUS. Prepared Calamine. Dub.

Reduce Calcined Calamine Stone into powder, and separate the finer particles in the manner ordered in the preparation of chalk.

Calamine is an ore of zinc, the composition of which is variable. Some varieties of it appear to consist of oxide of zinc, combined with siliceous earth; but the more common varieties are composed of the carbonate more or less pure. When calcined by a moderate heat, it becomes friable so as to be more easily reduced to powder; and as this calcination is performed in preparing it for converting copper into brass by cementation, it is ordered in the Edinburgh Pharmacopœia, to be obtained in this state, and then to be reduced to a fine powder by levigation, and washing in the same manner as carbonate of lime. Considerable care requires to be taken in this levigation, as the powder is applied to purposes, where, if it were coarse, it would prove irritating. It is used as an application to superficial inflammation and excoriation, dusted on the part, and it forms the basis of the common healing cerate, to which it communicates a degree of consistence and tenacity.

OXIDUM ZINCI IMPURUM PRÆPARATUM, *olim Tutia Præparata.* Prepared Impure Oxide of Zinc, formerly Prepared Tutty. Ed.

Let Tutia be prepared in the same manner as Carbonate of Lime.

Tutia is a substance, the origin of which is somewhat doubtful; it consists of oxide of zinc with argillaceous earth; and the most probable account with regard to it is, that it is the sublimate collected in the chimneys in which zinc is calcined, mixed with clay and water, and baked. It is used externally for the same purposes as calamine, and hence requires to be well levigated.

OXIDUM ZINCI. Oxide of Zinc. Ed.

Let a large crucible be placed in a furnace filled with burning fuel, in such a manner that it shall be somewhat inclined to its mouth; and when the bottom of the crucible is at a moderate red heat, throw in a piece of zinc, about the weight of one drachm. The zinc soon inflames, and is converted into white flocculi, which are to be removed, from time to time, from the surface of the metal, with an iron spatula, that the combustion may proceed more perfectly; and, when the inflammation ceases, remove the oxide of zinc from the crucible. Another piece of zinc being thrown in, the operation is to be renewed and repeated as often as may be necessary. Lastly, let the oxide of zinc be prepared in the same manner as carbonate of lime.

ZINCI OXYDUM. Oxyd of Zinc. Lond.

Throw successively pieces of Zinc into a red-hot crucible, large, deep, and inclined; another crucible being placed over it, in such a manner that the zinc may be exposed to the air, and may admit of being stirred frequently with an iron spatula. Remove immediately the oxide which is produced, and pass the white and lighter part of it through a sieve. Lastly, pour water on this, so as to form a fine powder in the manner directed for preparing chalk.

OXYDUM ZINCI. Oxyd of Zinc. Dub.

Take of Zinc broken into small pieces, any quantity. Throw these at intervals into a crucible at a red heat, sufficiently deep, the mouth of which inclines a little towards the mouth of the furnace, placing over it at each time another crucible inverted, but covering it loosely so that the air may not be excluded. Let the light and very white sublimed powder be preserved for use.

Zinc is the most inflammable of the metals. At the temperature of ignition, it attracts the oxygen of the atmospheric air, and burns vividly with a white and green light, producing an oxide in very light flocculi, which are in part carried off by the rapid current of air arising from the burning zinc, and hence the reason of the direction to cover the crucible, with another inverted, so that this may be obviated,—a direction however not easily complied with, without impeding the burning. The oxide accumulates so rapidly, that it must also be withdrawn to allow the combustion to proceed. Particles of metallic zinc are intermingled with it, and hence the necessity of submitting it to levigation. It is light, white, tasteless, and insoluble in water, and contains about 20 of oxygen in 100 parts. In medicine it is employed principally as an antispasmodic in epilepsy and chorea. Its dose is from two to five grains twice a-day, and this is gradually increased. It also forms the basis of a healing cerate.

SULPHAS ZINCI, *olim Vitriolum Album.* Sulphate of Zinc. Ed.

Take of Zinc cut into small pieces, three ounces; Sulphuric Acid, five ounces; Water, twenty ounces. Mix them, and the effervescence being finished, digest for some time on warm sand. Then strain the liquor through paper; and, after due exhalation, put it aside, that crystals may be formed.

ZINCI SULPHAS. Sulphate of Zinc. Lond.

Take of Zinc in small pieces, three ounces; Sulphuric Acid, five ounces; Water, four pints. Mix them in a glass vessel, and the effervescence being over, strain the liquor through paper; then boil it until a pellicle form on the surface, and put it aside, that crystals may form.

SULPHAS ZINCI. Sulphate of Zinc. Dub.

Take of Zinc reduced to powder, in the same manner that tin is, three ounces; Sulphuric Acid, five ounces; Water, a pint. To the zinc put into a glass vessel, add gradually the acid previously diluted with the water; when the effervescence ceases, digest for a short time; then evaporate the strained liquor, and after due evaporation, put it aside, that crystals may form.

The sulphuric acid in this process, by a resulting affinity, enables the zinc to decompose the water, attracting its oxygen, the hydrogen being disengaged with effervescence: the oxide of zinc combines with the acid, forming the sulphate, and by evaporation this is obtained in acicular crystals. The process, however, is scarcely ever performed in the shops, the sulphate of zinc being prepared on a large scale, from certain varieties of the native sulphuret of the metal. These are roasted, and exposed to air and humidity; oxygen is absorbed, the zinc is oxidated, and the sulphur is converted into sulphuric acid; the sulphate of zinc is extracted by lixiviation; and its solution is usually evaporated so far, that on cooling, the salt concretes in a granular mass, forming the white vitriol of commerce. It usually contains a little sulphate of iron, and sometimes, it has been supposed, a portion of sulphate of copper and of lead. From the insolubility of the latter salt, it can scarcely be present; the sulphate of copper is scarcely ever to be discovered, and the sulphate of iron is in small quantity, and cannot communicate any injurious quality. And as sulphate of zinc is principally employed externally, the neglect of this process, and the substitution of the common white vitriol are of less importance.

Sulphate of zinc is used principally as an astringent, in the form of solution; as an injection in gonorrhœa, and a collyrium in ophthalmia: sometimes also internally as an emetic, and in smaller doses as an astringent and tonic. These applications of it have been already considered.

SOLUTIO SULPHATIS ZINCI. Solution of Sulphate of Zinc. Ed.

Take of Sulphate of Zinc, sixteen grains; Water, eight ounces; Diluted Sulphuric Acid, sixteen drops. Dissolve the sulphate of zinc in water; then the acid being added, strain through paper.

This solution is designed to be used as a collyrium in ophthalmia, the sulphuric acid dissolving any excess of oxide that may be present in the common sulphate of zinc, if it be employed, and coinciding with it in astringency. As an injection in gonorrhœa, the solution, without the acid, is preferable, as sufficiently astringent and less irritating, and perhaps is equally preferable as a collyrium.

SOLUTIO ACETITIS ZINCI. Solution of Acetite of Zinc. Ed.

Take of Sulphate of Zinc, one drachm; Distilled Water, ten ounces. Dissolve it. Take also of Acetite of Lead, four Scruples; Distilled Water, ten ounces. Dissolve it. Mix the solutions. Let the liquor remain at rest a little; then strain it.

Sulphate of zinc and acetate of lead being the two astringent salts which usually form the basis of the astringent injection employed in gonorrhœa, they had frequently been conjoined in one formula, without the prescriber perhaps being always aware of the decomposition they suffer. The solution, however, was found to answer sufficiently well, being astringent without proving irritating. The use of it led to the introduction of the present process, in which the proportions are properly adjusted. The two salts exchange their principles, the sulphuric acid of the sulphate of zinc combining with the oxide of lead of the acetate of lead, while the acetic acid unites with the oxide of zinc: the sulphate of lead being insoluble, is precipitated, and is removed by filtration; the acetate of zinc remains dissolved. It is used both as an injection in gonorrhœa, and a collyrium in ophthalmia.

TINCTURA ACETATIS ZINCI. Tincture of Acetate of Zinc. Dub.

Take of Sulphate of Zinc, one ounce; Acetate of Potash, the same quantity. Triturate them together, and add of Rectified Spirit, one pint. Macerate for a week, agitating the liquor frequently, and strain it through paper.

In this process a similar decomposition takes place, the sulphuric acid of the sulphate of zinc combining with the potash of the acetate of potash, while the acetic acid enters into union with the oxide of zinc. The spirit dissolves the acetate of zinc, while the sulphate of potash remains in a great measure undissolved. The solution is strongly impregnated with the metallic salt, and a collyrium or injection of the usual strength may be prepared extemporaneously, by adding a certain proportion of it to water, though it requires much larger dilution than is proportional to the quantity of acetate of zinc it contains, to reduce the stimulant operation of the spirit. The formula appears to have no advantage over the more direct and simple method given by the Edinburgh College.

## STANNUM.—TIN.

**Pulvis stanni.** Powder of Tin. Dub.

Take of Tin, any quantity. Having melted it in an iron mortar, agitate it as it cools, until it is reduced to powder, which, when cold, is to be passed through a sieve.

Tin, when heated near to its melting point, becomes brittle, so as to be easily reduced to fragments. When melted, therefore, if stirred or agitated as it becomes solid, this effect is obtained, and a granular powder is formed more easily than by any other method. Its powers as an anthelmintic have been already considered.

## ARSENICUM.—ARSENIC.

**ARSENICI OXYDUM PRÆPARATUM.** Prepared Oxide of Arsenic. Lond.

Triturate Oxide of Arsenic into powder; then put it into a crucible, and applying heat, sublime it into another crucible placed over the former.

Oxide of Arsenic is usually obtained by sublimation from the ores of cobalt in which it is contained, and which are roasted with the view of obtaining the oxide of cobalt for the purposes to which it is applied in the arts. The arsenical oxide is collected in the chimney and flues of the furnace; it is impure, but is usually purified by sublimation before it is brought to the shops, and is in the state either of a solid cake or a powder. Oxide of arsenic is a substance so very active, that any foreign matter it can contain in this state can be of no importance, and the present process is altogether superfluous. Its properties and medicinal applications have been already considered.

**LIQUOR ARSENICALIS.** Arsenical Solution. Lond.

Take of Prepared Oxide of Arsenic, rubbed to a very fine powder, Sub-carbonate of Potash from Tartar, of each sixty-four grains; Distilled Water, a pint. Boil them together in a glass vessel until the arsenic is entirely dissolved. To the solution when cold, add Compound Spirit of Lavender, four fluidrachms: Then add as much Distilled Water as may be necessary to make up the measure of a pint.

The substance named Oxide of Arsenic has by some chemists been considered as an acid, and named Arsenious Acid. It is not, like the greater number of oxides, insipid and insoluble in water, but has a sharp taste, and is soluble in not more than 80 parts of cold, and 15 of boiling water. It reddens the more delicate vegetable colours, particularly the infusion of litmus, and it combines with the alkalis. The alkaline properties, however, do not appear to be neutralized in these combinations; and it even neutralizes, as Berthollet affirms, the acids in combining with them. And hence, on the whole, it is to be regarded as an oxide in a high degree of oxidation. By combination with potash it becomes more soluble in water; and to render the solution of it perfect, and obtain it in a form in which its dose can be easily regulated, is the object of the present process. The formula was introduced by Fowler, as giving a substitute for the arsenical preparation known under the name of Tasteless Ague Drop. Each ounce of the solution contains four grains of the oxide. The dose is four drops three times a-day, as a remedy in intermittent fever, given with the precautions which have been pointed out under its medical history. The spirit of lavender is designed to communicate colour and flavour; but it would have been better to have added some other tincture, the flavour of which is less commonly known, and the taste less grateful, so as to have guarded against the possibility of the solution being incautiously swallowed.

ARSENIAS KALI. Arseniate of Potash. Dub.

Take of White Oxide of Arsenic, Nitrate of Potash, each one ounce. Reduce them separately to powder; then put them mixed together into a glass retort, placed in a sand-bath, and apply heat, raising it gradually until the bottom of the retort is obscurely red. The vapours which arise should, by an apparatus adapted to that purpose, be transmitted through distilled water, that the nitrous acid disengaged by the heat may be condensed. Dissolve the residual matter in four pounds of boiling distilled water, and after due evaporation put it aside, that crystals may form.

Arsenic, by a high degree of oxygenation, acquires unequivocally the properties of an acid. This acid, the Arsénic as it is named, is formed by distilling nitrous acid from the oxide of arsenic, the nitrous acid yielding to the oxide the requisite proportion of oxygen. The same change is produced by the present process; the nitric acid of the nitre being decomposed, the oxide of arsenic acquiring from it as much oxygen as converts it into arsénic acid, and this acid remaining combined with the potash of the nitre. The residual mass, therefore, when a sufficient degree of heat has been applied to expel or decompose the whole of the nitrous acid, is arseniate of potash. This salt is very soluble in water, and crystallizable. By evaporation of its solution it is obtained in large regular crystals, their figure being a tetraedral prism: in this form, and as obtained by this process, the salt has generally a slight excess of acid: when perfectly neutral, it does not crystallize so easily.

Under this form, as well as under that of the preceding preparation, arsenic has been employed as a remedy in intermittent fever, and in some cutaneous diseases. The dose is from one-sixteenth to one-eighth of a grain of the crystallized salt. It does not appear to have any advantage, however, over the more simple preparation.

# CHAP. XXI.

## PULVERES.—POWDERS.

THIS is the simplest form of composition of medicines, the different articles being merely reduced to powder, and mixed together. It is adapted to the exhibition of such remedies as are not ungrateful, and such as are not liable to lose their virtues by keeping; and is usually an improper form for those which are bitter, acrid or fœtid, which require to be given in a large dose, or which are not easily diffused in water, the vehicle in which powders are usually taken. The dose of a powder seldom exceeds a drachm; and if it require to be given only in a few grains, it is better that it should be under the form of bolus. When it is to be taken, it is merely diffused in water, wine, or any other convenient vehicle.

PULVIS AROMATICUS. Aromatic Powder. Ed.

Take of Bark of Cinnamon, Cardamom Seeds, Ginger Root, of each equal parts. Rub them into a very fine powder, which is to be kept in a glass phial well stopt.

PULVIS CINNAMOMI COMPOSITUS. Compound Powder of Cinnamon. Lond.

Take of Bark of Cinnamon, two ounces; Cardamom Seeds, an ounce and a half; Ginger Root, an ounce; Long Pepper, half an ounce. Rub them together so as to form a fine powder.

PULVIS AROMATICUS. Aromatic Powder. Dub.

Take of Bark of Cinnamon, two ounces; Cardamom Seeds, freed from the capsules, Ginger, Long Pepper, of each an ounce. Rub them together into powder.

This combination of aromatics is designed merely to communicate to other compositions fragrance and pungency, and to obviate the nausea which ungrateful medicines are liable to excite. The quantity added to a dose is generally about five grains.

PULVIS ASARI COMPOSITUS. Compound Powder of Asarabacca. Ed.

Take of the Leaves of Asarabacca, three parts; the Leaves of Marjoram, Flowers of Lavender, of each one part. Rub them together to a powder.

PULVIS ASARI COMPOSITUS. Compound Powder of Asarabacca. Dub.

Take of the Leaves of Asarabacca dried, an ounce; Flowers of Lavender dried, two drachms. Rub them together, and form a powder.

This is used as a mild errhine, forming the composition known by the name of Herb Snuff. When snuffed in the quantity of a few grains, it occasions sneezing and a discharge of mucus, and is sometimes used in headach and ophthalmia.

PULVIS CARBONATIS CALCIS COMPOSITUS, *olim Pulvis Cretaceus.* Compound Powder of Carbonate of Lime. Ed.

Take of Prepared Carbonate of Lime, four ounces; Bark of Cinnamon, one drachm and a half; Nutmeg, half a drachm. Rub them together to powder.

This is designed to be used as a grateful antacid. It is given in the dose of one drachm.

PULVIS CRETÆ COMPOSITUS. Compound Powder of Chalk. Lond.

Take of Prepared Chalk, half a pound; Bark of Cinnamon, four ounces; Tormentil Root, Gum-Arabic, of each three ounces; Long Pepper, half an ounce. Reduce them separately to powder, and mix them.

In this composition, though analogous to the preceding one, the proportion of the aromatics is larger, and the addition of the tormentil root renders it more astringent. It is used to relieve diarrhœa arising from acidity, being given in the dose of half a drachm or a drachm.

PULVIS CRETÆ COMPOSITUS CUM OPIO. Compound Powder of Chalk with Opium. Lond.

Take of Compound Powder of Chalk, six ounces and a half; Hard Opium, rubbed to powder, four scruples. Mix them.

The addition of opium to astringents and antacids, when given in diarrhœa, is a common practice, and this formula affords a convenient composition of this kind. Its dose is one scruple, or half a drachm. Two scruples contain one grain of opium.

PULVIS JALAPÆ COMPOSITUS. Compound Powder of Jalap. Ed.

Take of the Powder of the Root of Jalap, one part; Super-Tartrate of Potash, two parts. Rub them together into a very fine powder.

This combination affords an excellent purgative, less stimulating, and less liable to excite griping than the jalap alone. It is given in the dose of a drachm or a drachm and a half; and in dropsy, as a hydragogue cathartic, to the extent of two drachms.

PULVIS IPECACUANHÆ ET OPII, *olim Pulvis Doveri.* Powder of Ipecacuanha and Opium. Ed.

Take of the Powder of the root of Ipecacuanha, Opium, of each one part; Sulphate of Potash, eight parts. Rub them together into a fine powder.

PULVIS IPECACUANHÆ COMPOSITUS, Compound Powder of Ipecacuanha. Lond.

Take of Root of Ipecacuanha in powder, Hard Opium in powder, of each a drachm; Sulphate of Potash, one ounce. Mix them.

PULVIS IPECACUANHÆ COMPOSITUS. Compound Powder of Ipecacuanha. Dub.

Take of Ipecacuanha Root, Hard Purified Opium, of each reduced to powder, one drachm; Sulphate of Potash, one ounce. Rub them together, and form a powder.

This composition, Dover's Powder, has long been established in practice, and is one of those useful combinations, which experience, or rather accident discovers, the powers of which could not have been inferred *à priori* from the known operation of its ingredients. It affords one of the best examples of the power which one medicine has of modifying the action of another, the ipecacuan rendering the operation of the opium, as a sudorific, much more certain than it otherwise would be, and appearing also to diminish its narcotic effect, so that the composition can be given with safety in pure inflammatory affections, in which opium alone would be hazardous. The sulphate of potash serves to divide the particles of the opium and ipecacuan, and mix them more intimately; and such is the advantage derived from it, that, as Dr Blane has remarked, the opium and ipecacuan alone, mixed in the above proportions, have not the same effect. Hence, too, the operation of the powder is always more certain when it has been triturated to a great degree of fineness, and the directions in some of the Pharmacopœias are in this respect imperfect. This powder is the most powerful and certain sudorific we possess. Its medium dose is fifteen grains, the operation of which is to be assisted by the sweating regimen; and frequently it is necessary to give additional smaller doses at intervals, to produce sweat. Its principal use is in acute rheumatism; but it is prescribed in all cases with propriety where full sweating is to be induced.

PULVIS OPIATUS. Opiate Powder. Ed.

Take of Opium, one part; Prepared Carbonate of Lime, nine parts. Rub them together to a fine powder.

This is designed as a convenient form for administering opium. Ten grains contain a grain of opium, and form a medium dose. It is however little used.

PULVIS CORNU USTI CUM OPIO. Powder of Burnt Hartshorn with Opium. Lond.

Take of Hard Opium rubbed to powder, one drachm; Burnt and Prepared Hartshorn, an ounce; Cochineal in powder, a drachm. Mix them.

This, in the former edition of the Pharmacopœia, had the name of Pulvis Opiatus, which has been changed to its present appellation, as being less liable to be confounded with Powder of Opium. A little cochineal is added to give it colour. The burnt hartshorn divides the opium, and from its hardness and grittiness is better adapted to this than the chalk of the preceding preparation. One grain of opium is contained in ten of the powder.

PULVIS SCAMMONII COMPOSITUS. Compound Powder of Scammony. Ed.

Take of Scammony, Super-Tartrate of Potash, of each equal parts. Rub them together into a very fine powder.

Scammony given alone, is liable to act as a purgative rather with violence, while its operation is at the same time somewhat uncertain. By the addition of the supertartrate of potash, its cathartic operation is rendered more certain and less irritating. It is also preferred to the scammony alone, as a hydragogue cathartic. Its dose is from ten to twenty grains.

PULVIS SCAMMONII COMPOSITUS. Compound Powder of Scammony. Lond.

Take of Scammony, Hard Extract of Jalap, of each two ounces; Ginger, half an ounce. Rub them separately into a very fine powder, then mix them.

This composition, though under the same name as the preceding one, is of a very different nature; the stimulating operation of the scammony not being corrected, but rather increased by the addition of the extract of jalap. The ginger will communicate an aromatic pungency, and obviate griping. The compound is a strong cathartic. Its medium dose is ten grains.

PULVIS SULPHATIS ALUMINÆ COMPOSITUS, *olim Pulvis Stypticus*. Compound Powder of Sulphate of Argil. Ed.

Take of Sulphate of Alumine, four parts; Kino, one part. Rub them together into a fine powder.

This being a combination of two powerful astringents, has been sometimes used internally in menorrhagia, in repeated doses of ten or fifteen grains, and externally as a styptic application to bleeding wounds.

The following Powders have a place in the London or Dublin Pharmacopœia, without any preparations corresponding to them in the Edinburgh Pharmacopœia.

Pulvis aloes compositus. Compound Powder of Aloes. Lond.

Take of Socotorine Aloes, one ounce and a half; Guaiac Gum-Resin, one ounce; Compound Powder of Cinnamon, half an ounce. Rub the aloes and guaiac separately into powder; then mix them with the compound powder of cinnamon.

Pulvis aloes cum guaiaco. Powder of Aloes with Guaiac. Dub.

Take of Hepatic Aloes, an ounce and a half; Gum-Resin of Guaiac, an ounce; Aromatic Powder, half an ounce. Rub the aloes and guaiac separately to powder; then mix them with the aromatic powder.

This combination of aloes with guaiac is designed as a stimulating aperient, and may be given in a dose of fifteen or twenty grains. The form of powder is however very ill adapted to the exhibition of a substance so bitter and nauseous as aloes, or of resinous substances, such as guaiac; and the composition is therefore little used.

Pulvis aloes cum canella. Powder of Aloes with Canella. Dub.

Take of Hepatic Aloes, one pound; White Canella, three ounces. Rub them separately to powder; then mix them.

This had a place in the former edition of the London Pharmacopœia, but is now thrown out. The canella covers the unpleasant flavour of the aloes; and this combination is sometimes used as a warm stimulating cathartic, not under the form of powder, but made into a tincture, by infusing it in spirit. A composition of this kind, designed for this purpose, has long been kept in the shops, under the name of Hiera Picra.

PULVIS CONTRAYERVÆ COMPOSITUS. Compound Powder of Contrayerva. Lond.

Take of Contrayerva Root, rubbed to powder, five ounces; Prepared Shells, one pound and a half. Mix them.

This is a composition which has long kept its place in the Pharmacopœias, and has been often reformed. It is scarcely adapted to any important purpose, or possessed of any advantage. It has been given as a tonic and stimulating diaphoretic, in a dose of half a drachm, or two scruples.

PULVIS KINO COMPOSITUS. Compound Powder of Kino. Lond.

Take of Kino, fifteen drachms; Cinnamon Bark, half an ounce; Hard Opium, a drachm. Triturate them separately into a very fine powder, then mix them.

Kino is one of the most powerful vegetable astringents. The cinnamon will communicate to it a grateful aromatic flavour and pungency, and the addition of the opium will render it a more powerful remedy in diarrhœa. Yet the form of powder does not appear to be well adapted to its administration; nor does there appear any particular reason for introducing this as an officinal preparation. One part of opium is contained in twenty, and it may be given in a dose from ten to twenty grains.

PULVIS SENNÆ COMPOSITUS. Compound Powder of Senna. Lond.

Take of Leaves of Senna, Super-Tartrate of Potash, of each two ounces; Scammony, half an ounce; Ginger, two drachms. Rub the scammony separately, the others together, into a fine powder, and mix them.

This may be employed as a purgative, in a dose of from half a drachm to a drachm. The senna is, however, so inferior in power to the scammony, that there appears to be little advantage in their combination, nor is the form of powder well adapted to their exhibition.

PULVIS TRAGACANTHÆ COMPOSITUS. Compound Powder of Tragacanth. Lond.

Take of Tragacanth, rubbed to powder, Gum Arabic in powder, Starch, of each one ounce and a half; Refined Sugar, three ounces. Triturate the starch and sugar together into powder, then having added the tragacanth and the gum Arabic, mix them all together.

This combination of mucilaginous substances may be employed for the general purposes of demulcents, in the dose of a drachm, or two drachms frequently repeated. But it appears to be a very superfluous composition.

# CHAP. XXII.

## ELECTUARIA.—ELECTUARIES.

This term is applied to that form of compound medicines where the consistence is nearly that of thick honey. An electuary is composed, in general, of a powder reduced to the proper consistence by the addition of syrup or mucilage. It is a proper form for administering medicines which are not very disagreeable in their taste or flavour; and, except in a few officinal preparations, it is an extemporaneous prescription, as when long kept it is liable to become too thick and adhesive from the evaporation of part of its moisture. Dry powders generally require twice their weight of syrup to bring them to the due consistence; and syrup is preferable to mucilage, as the electuary made with the former does not so soon become dry. The common dose of an electuary rarely exceeds two tea-spoonfuls, and is seldom less than a tea-spoonful; any very active medicine, which requires to be given in a smaller dose, being usually administered under the form of bolus.

The London College have united the Electuaries with the Conserves, as they are both compositions of vegetable matter with sugar, and are of similar consistence; and have given to them the common name of Confections. In conserves, however, the addition of the saccharine matter is in much larger proportion, and is designed to preserve the vegetable matter; in electuaries, the syrup is designed merely to communicate the required form. The Edinburgh College retain the distinction of conserves, and the individual preparations which have this name have been already considered.

Electuarium aromaticum. Aromatic Electuary. Ed.

Take of Aromatic Powder, one part; Syrup of Orange-Peel, two parts. Mix, beating them well together, so as to form an electuary.

Confectio aromatica. Aromatic Confection. Lond.

Take of Cinnamon Bark, Nutmegs, each two ounces; Cloves, one ounce; Cardamom Seeds, half an ounce; Saffron dried, two ounces; Prepared Shells, sixteen ounces; Refined Sugar, two pounds; Water, a pint. Triturate the dry substances together into a fine powder, then add the water gradually, and mix them so as to form an uniform mass.

Electuarium aromaticum. Aromatic Electuary. Dub.

Take of Cinnamon, Nutmeg, each half an ounce; Refined Sugar, Saffron, each one ounce; Cardamom Seeds, freed from the capsules, Cloves, each two drachms; Precipitated Chalk, two ounces; Syrup of Orange, as much as necessary. Reduce the aromatics separately to powder; then mix them with the syrup.

The composition of the Edinburgh Pharmacopœia is the most simple of these; in that of the London and Dublin Pharmacopœias, the carbonate of lime is foreign to the object of the combination, though, as it has long had a place, it is still retained. Either electuary is a grateful aromatic preparation, occasionally combined with other medicines, or made the basis of cordial or carminative mixtures, requiring merely for this purpose to be diffused in water with a little syrup.

ELECTUARIUM CASSIÆ FISTULÆ. Electuary of Purging Cassia. Ed.

Take of the Pulp of Cassia in pods, four parts; Pulp of Tamarind, Manna, of each one part; Syrup of Pale Rose, four parts. Dissolve the manna beat in a mortar, with a gentle heat, in the syrup; then add the pulps, and, by a continued heat, reduce the mixture to a proper consistence.

CONFECTIO CASSIÆ. Confection of Cassia. Lond.

Take of Fresh Pulp of Cassia, half a pound; Manna, two ounces; Pulp of Tamarind, an ounce; Syrup of Rose, half a pint. Bruise the manna, then dissolve it in the syrup by the heat of a water-bath; mix in the pulps, and evaporate to a proper consistence.

ELECTUARIUM CASSIÆ. Electuary of Cassia. Dub.

Take of Pulp of Cassia, recently extracted, half a pound; Manna, two ounces; Pulp of Tamarinds, an ounce; Syrup of Orange, half a pound. Dissolve the manna bruised, with a moderate heat, in the syrup; then add the pulps, and reduce the mixture by slow evaporation to the due consistence.

This electuary affords a mild laxative, which operates in the dose of an ounce. From the predominance of the pulps and the saccharine matter, it is liable, however, to become sour on keeping; it is also inferior in activity to the next electuary, which is equally pleasant, and hence, it is so little used, that it is never found in the shops.

ELECTUARIUM CASSIÆ SENNÆ, *olim Electuarium Lenitivum.* Electuary of Senna. Ed.

Take of the Leaves of Senna, eight ounces; Coriander Seeds, four ounces; Liquorice Root, three ounces; Figs, Pulp of Prunes, of each one pound; Pulp of Tamarind, half a pound; Refined Sugar, two pounds and a half. Bruise the senna with the coriander seeds, and separate by passing through a sieve ten ounces of the mixed powder. Boil the residuum with the figs and the liquorice in four pounds of water to one half; then express and strain. Reduce the strained liquor, by evaporation, to about a pound and a half. Afterwards add the sugar, so as to make a syrup. Add this syrup gradually to the pulps, and, lastly, mix in the powder.

CONFECTIO SENNÆ. Confection of Senna. Lond.

Take of Senna Leaves, eight ounces; Figs, a pound; Pulp of Tamarind, Pulp of Cassia, Pulp of Prune, of each half a pound; Coriander Seeds, four ounces; Liquorice Root, three ounces; Refined Sugar, two pounds and a half. Beat the senna leaves with the coriander seeds, and separate ten ounces of the mixed powder by a sieve. Boil the remainder with the figs and the liquorice root in four pints of water to one-half; then express and strain. Evaporate the strained liquor in a water-bath until only a pint and a half remain, then adding to it the sugar, form a syrup. Lastly, rub the pulps with the syrup, and sprinkling in the powder passed through the sieve, mix the whole together.

ELECTUARIUM SENNÆ. Electuary of Senna. Dub.

Take of Senna Leaves in fine powder, four ounces; Pulp of Prunes, a pound; Pulp of Tamarinds, two ounces; Syrup of Brown Sugar (Molasses), a pint and a half; Essential Oil of Caraway, two drachms. Boil down the pulps in the syrup to the consistence of honey; then add the powder, and, when the mixture cools, the oil; lastly, mix them all well together.

This electuary is in common use as a mild and pleasant purgative. Its dose is six drachms, or an ounce; and it is sometimes rendered more active by the addition of a little jalap, or super-tartrate of potash. The electuary of the Dublin Pharmacopœia, though more simple than the others, must be less grateful, from containing so large a proportion of molasses; and the oil of caraway will communicate rather too much pungency to a medicine in this form.

ELECTUARIUM MIMOSÆ CATECHU, *olim Confectio Japonica* Electuary of Catechu. Ed.

Take of Extract of Catechu, four ounces; Kino, three ounces; Bark of Cinnamon, Nutmeg, of each one ounce; Opium, diffused in a sufficient quantity of Spanish White Wine, one drachm and a half; Syrup of Red Rose, boiled to the consistence of honey, two pounds and a quarter. Reduce the solid ingredients to powder, and, mixing with them the opium and syrup, form an electuary.

ELECTUARIUM CATECHU COMPOSITUM. Compound Electuary of Catechu. Dub.

Take of Catechu, four ounces; Cinnamon, two ounces; Kino, three ounces. Rub them into powder; then add of Hard Purified Opium, a drachm and a half, diffused in Spanish White Wine; Syrup of Ginger boiled to the consistence of honey, two pounds and a quarter. Mix the whole.

In this electuary, the more powerful vegetable astringents are combined; they are rendered more grateful by the addition of the aromatics, and the efficacy of the composition, as a remedy in diarrhœa, is increased by the opium. It is the basis of the common extemporaneous astringent mixture; two drachms of it being diffused with a little syrup in six ounces of water, and a table-spoonful of this being taken three or four times a-day. One grain of opium is contained in rather more than three drachms.

ELECTUARIUM OPIATUM, *olim Electuarium Thebaicum.* Opiate Electuary. Ed.

Take of Aromatic Powder, six ounces; Virginian Snake-root, rubbed to a fine powder, three ounces; Opium, diffused in a sufficient quantity of Spanish White Wine, half an ounce; Syrup of Ginger, one pound. Mix, so as to form an electuary.

CONFECTIO OPII. Confection of Opium. Lond.

Take of Hard Opium, rubbed to powder, six drachms; Long

Pepper, an ounce; Ginger-root, two ounces; Caraway Seeds, three ounces; Syrup, a pint. Rub the opium with the syrup heated, then add the other ingredients ground to powder, and mix them.

This is a substitute for compositions once highly celebrated, and which have long kept their place in the Pharmacopœias of Europe, the Mithridate and Theriaca, which at one period consisted of above an hundred ingredients. Opium appeared, amid this farrago, to be the ingredient of predominating power, modified principally by aromatics; they have been, therefore, gradually reformed into the present preparation, and even it is scarcely used. Each drachm, prepared according to the formula in the Edinburgh Pharmacopœia, contains a grain and a half of opium; and rather more in that prepared by the prescription of the London College, thirty-six grains of the latter containing one grain.

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It remains to take notice of those Electuaries or Confections as they are named, peculiar to the London or Dublin Pharmacopœias.

CONFECTIO AMYGDALÆ. Almond Confection. Lond.

Take of Sweet Almonds, an ounce; Gum Arabic in powder, a drachm; Refined Sugar, half an ounce. The almonds having been previously macerated in water, and their external pellicle removed, beat the whole together, until they form an uniform mass.

This is introduced as affording an easy and convenient mode of preparing the almond emulsion extemporaneously; a little of this confection forming it by diffusion in water.

CONFECTIO RUTÆ. Confectio of Rue. Lond.

Take of the Dried Leaves of Rue, Caraway Seeds, Bay Berries, of each an ounce and a half; Sagapenum, half an ounce; Black Pepper, two drachms; Clarified Honey, sixteen ounces. Triturate the dry ingredients into a fine powder; then having added the honey, mix them all together.

This is intended as the basis of a moderately stimulating enema, sometimes given in the hysteric paroxysm, and in flatulent colic.

CONFECTIO SCAMMONIÆ. Confection of Scammony. Lond.

Take of Scammony powder, an ounce and a half; Cloves, bruised, Ginger-Root in powder, of each six drachms; Oil of Caraway, half a fluidrachm; Syrup of Rose, as much as may be necessary. Triturate the dry substances into a very fine powder; then having added the syrup, rub them again; and, adding the oil of caraway, mix them together.

ELECTUARIUM SCAMMONIÆ. Electuary of Scammony. Dub.

Take of Scammony, Ginger-Root, of each reduced to powder, an ounce; Oil of Cloves, a scruple; Syrup of Orange, as much as is sufficient. Mix the ginger, rubbed to powder, with the syrup; then add the scammony, and, lastly, the oil.

This is a stimulating cathartic, not very frequently employed. Its dose is from half a drachm to a drachm.

# CHAP. XXIII.

## PILULÆ.—PILLS.

Pills are formed from a mass sufficiently stiff and adhesive to preserve the round form which is given to them. Under this form, such medicines are generally exhibited as are nauseous, either in taste or flavour, and such as operate in a small dose. Few general rules require to be given with regard to their formation. Such of the ingredients as are capable of being reduced to powder, are first triturated to the requisite fineness; those which are of a softer consistence are then added, and if this is not sufficient to bring the whole to a proper consistence, a small quantity of syrup or mucilage is to be added; the former is preferable, as the latter, in drying, is liable to render the mass too hard. Some substances, as several of the gum-resins, become soft on beating, so as to form into pills. Light vegetable powders, when beat up with syrup, form a mass which is not sufficiently coherent to roll out. In this case it is necessary to add a small quantity of pure soap, which gives the necessary tenacity. Metallic preparations, which are heavy, and given in a small dose, are made into pills by the addition of some extract or conserve. If the pill mass is too soft, so that the pills, after being formed, do not keep their form, it may be made harder by the addition of a small quantity of any inactive vegetable matter, as powder of liquorice. After they are rolled out, they must, to prevent them from adhering, be covered with the same powder, or, what is preferable, as less liable to become mouldy, starch or carbonate of magnesia. A pill ought not to exceed five grains in weight, or twelve may be formed from a drachm of the mass. They ought not to be prepared in too large a quantity at a time, as if long kept they become so hard as to be scarcely acted on in the stomach.

PILULÆ ALOETICÆ. Aloëtic Pills. Ed.

Take of Socotorine Aloes reduced to powder, Soap, of each equal weights. Beat them with Simple Syrup, so as to make a mass fit for pills.

In this formula extract of gentian was formerly employed, but it rendered the mass too soft to form properly into pills. It affords a convenient form for the exhibition of aloes, and is in common use as a purgative. Its medium dose is 10 or 15 grains.

PILULÆ ALOES COMPOSITA. Compound Aloes Pills. Lond.

Take of Socotorine Aloes, in powder, one ounce; Extract of Gentian, half an ounce; Oil of Caraway, forty minims; Syrup, as much as necessary. Beat them together until they form a mass.

Under either of these simple forms aloes is very commonly exhibited as a cathartic. Two pills are a medium dose.

PILULÆ ALOES CUM ZINGIBERE. Pills of Aloes with Ginger. Dub.

Take of Hepatic Aloes, one ounce; Ginger Root in powder, one drachm; Spanish Soap, half an ounce; Essential Oil of Peppermint, half a drachm. Triturate the aloes with the ginger to powder; add the soap and essential oil, and form the whole into one mass.

This composition is adapted to the same purposes as the preceding pills, the essential oil adding aromatic flavour and pungency. Their dose is the same.

PILULÆ ALOES ET ASSAFŒTIDÆ. Pills of Aloes and Assafœtida. Ed.

Take of Socotorine Aloes in powder, Assafœtida, Soap, of each equal parts. Beat them into a mass with mucilage of gum Arabic.

These pills are occasionally employed in amenorrhœa, hysteria, in dyspepsia attended with flatulence, and in tympanitis, two or three being taken at bedtime. They will at least prove useful by obviating costiveness,

PILULÆ ALOES CUM COLOCYNTHIDE. Pills of Aloes with Colocynth. Ed.

Take of Socotorine Aloes, Scammony, of each eight parts; Colocynth, four parts; Sulphate of Potash with Sulphur, Oil of Cloves, of each one part. Let the aloes and scammony be reduced, with the salt, to powder; then let the colocynth, rubbed into a fine powder, and the oil, be added. Lastly, beat them with mucilage of gum Arabic into a mass.

PILULÆ COLOCYNTHIDIS COMPOSITÆ. Compound Colocynth Pills. Dub.

Take of Colocynth, half an ounce; Hepatic Aloes, Scammony, of each an ounce; Spanish Soap, two drachms; Oil of Cloves, one drachm. Reduce the aloes, scammony, and colocynth separately to powder, then beat them together with the oil and soap, and with syrup form them into a mass.

These compositions are of similar powers. They afford a stronger cathartic than the simple aloëtic pill, and accordingly this compound pill is used in constipation, or to obviate habitual costiveness. Two pills are a dose.

PILULÆ ALOES ET MYRRHÆ. Pills of Aloes and Myrrh. Ed.

Take of Socotorine Aloes, four parts; Myrrh, two parts; Saffron, one part. Beat them into a mass with Simple Syrup.

PILULÆ ALOES CUM MYRRHA. Pills of Aloes and Myrrh. Lond.

Take of Socotorine Aloes, two ounces; Saffron, Myrrh, of each an ounce; Syrup, a sufficient quantity. Rub the aloes and myrrh separately into powder, then beat the whole together, until they form a mass.

PILULÆ ALOES CUM MYRRHA. Pills of Aloes and Myrrh. Dub.

Take of Hepatic Aloes, an ounce; Myrrh, half an ounce; Saffron, two drachms; Essential Oil of Caraway, half a drachm; Syrup, a sufficient quantity. Rub the aloes and myrrh separately to powder; then beat the whole into a mass.

These pills, under the name of Rufus's Pills, have long been in use, as affording a moderately stimulating cathartic, useful in dyspepsia connected with costiveness; sometimes used also in hypochondriasis, hysteria, and in jaundice. Their dose is ten or fifteen grains.

PILULÆ AMMONIARETI CUPRI. Pills of Ammoniuret of Copper. Ed.

Take of Ammoniuret of Copper, rubbed into fine powder, sixteen grains; Crumb of Bread, four scruples; Water of Carbonate of Ammonia, as much as may be sufficient. Beat them into a mass, which divide into thirty-two equal pills.

It is under this form that ammoniuret of copper is given in epilepsy and the other spasmodic diseases in which it has been employed. Half a grain of it is contained in each pill. One pill is given at first, night and morning, and the dose is gradually increased, as far as the stomach and general system will bear it, until a cure is obtained, or the remedy has received a fair trial.

PILULÆ ASSÆFŒTIDÆ COMPOSITÆ. Compound Assafœtida Pills. Ed.

Take of Assafœtida, Galbanum, Myrrh, of each eight parts; Rectified Oil of Amber, one part. Beat them into a mass with Simple Syrup.

PILULÆ GALBANI COMPOSITÆ. Compound Pills of Galbanum. Lond.

Take of Galbanum, an ounce; Myrrh, Sagapenum, of each one ounce and a half; Assafœtida, half an ounce; Syrup, as much as may be sufficient. Beat them together, and form a mass.

PILULÆ MYRRHÆ COMPOSITÆ. Compound Pills of Myrrh. Dub.

Take of Assafœtida, Myrrh in powder, Galbanum, of each one ounce; Oil of Amber, half a drachm. Triturate them together, and form them into a mass with Simple Syrup.

These compositions, though under different names, are similar. They all form a substitute for the Gum Pills of the older Pharmaeopœias, and afford a stimulating aperient and antispasmodic used in hysteria and amenorrhœa, two or three of them being taken occasionally at bedtime.

PILULÆ HYDRARGYRI. Mercurial Pill. Ed.

Take of Purified Quicksilver, Conserve of Red Rose, of each one ounce; Starch, two ounces. Rub the quicksilver with the conserve, in a glass mortar, until the globules entirely disappear, adding, as there may be occasion, a little mucilage of gum Arabic; then add the starch, and beat, with a little water, into a mass, which is to be immediately divided into four hundred and eighty pills.

PILULÆ HYDRARGYRI. Pills of Quicksilver. Lond.

Take of Purified Quicksilver, two drachms; Conserve of Red Rose, three drachms; Liquorice Root in powder, one drachm. Rub the quicksilver with the conserve until the globules no longer appear, then adding the liquorice powder, beat the whole together so as to form a mass.

PILULÆ HYDRARGYRI. Pills of Quicksilver. Dub.

Take of Purified Quicksilver, two drachms; Conserve of Rose, three drachms; Liquorice in fine powder, one drachm. Rub the quicksilver with the conserve until the globules entirely disappear; then adding the powder of liquorice, mix the whole together.

The trituration of the quicksilver in this preparation was formerly supposed to reduce it merely to a state of extreme mechanical division. But there is every reason to believe that an oxidation of the metal is effected, and that the medicinal efficacy of the preparation depends on this oxide. Quicksilver, in its metallic state, being entirely inert with regard to the living system, the activity of the preparation itself is a presumption of this; but it is farther known, that by agitation with atmospheric air, quicksilver affords a portion of a grey powder, soluble in muriatic acid, and which must therefore be regarded as an oxide, metallic quicksilver being insoluble in that acid. This oxidation must be effected more readily when the surface of the metal is extended, and its continuity is divided by the interposition of any viscous matter, and hence the advantage derived from the trituration of it with substances of this kind, in the preparation of the mercurial pill. Different substances have been employed, syrup, mucilage, honey and others. The Colleges have now agreed in preferring the Conserve of Rose, it having been supposed that this is superior to the others in facilitating the operation.

Much attention is requisite that the trituration be continued until the extinction is completed, as on this the efficacy of the pill depends. This is known by rendering the matter a little thinner by the addition of a little water, and extending it by rubbing on a glass plate or on paper, when the globules, if any remain, will be apparent. Starch has been selected by the Edinburgh College to form it into a mass, and is preferable to liquorice powder, as not being liable to become mouldy. A grain of mercury is contained in each pill, weighing four grains, prepared according to the formula of the Edinburgh Pharmacopœia; the same quantity is contained in three grains of the others.

This pill is the preparation of mercury that is upon the whole most generally used for obtaining the general action of this metal on the system; and while it is milder in its operation than some others, and has less determination to the intestinal canal, it is sufficiently active and certain. The common dose, given with the view of inducing the usual mercurial action, is two pills at bedtime and one in the morning, which, in particular cases and habits, requires to be increased. Four or six pills given at once generally excite purging.

PILULÆ OPIATÆ, *olim Pilulæ Thebaicæ.* Opiate Pills. Ed.

Take of Opium, one part, Extract of Liquorice, seven parts; Jamaica Pepper, two parts. Mix the opium and the extract separately, softened with diluted alkohol, and beat them into a pulp; then add the Jamaica pepper rubbed to powder, and, beating them well, reduce them to a mass.

PILULÆ SAPONIS CUM OPIO. Pills of Soap with Opium. Lond.

Take of Hard Opium, rubbed to powder, half an ounce; Hard Soap, two ounces. Beat them together, until they form one mass.

PILULÆ STYRACE. Pills of Storax. Dub.

Take of Purified Storax, three drachms; Soft Purified Opium, one drachm; Saffron, the same weight. Beat them together, mixing them thoroughly.

The articles which in these compositions are added to the opium, cannot be supposed to have any important effect on its operation; they serve merely to disguise it; and where it is necessary, which it occasionally is, to conceal the administration of opium from the patient, they afford convenient forms. Even the name sometimes requires to be concealed in a prescription; and hence the reason of the names given by the London and Dublin Colleges being derived from the trivial ingredients. It is only to be regretted, that the proportion of opium is not the same in all of them. Two pills, or ten grains of the pill of the Edinburgh Pharmacopœia, contain one grain of opium; while in the formula of the London and Dublin Colleges, the proportion of opium is larger, five grains or one pill containing one grain.

PILULÆ RHEI COMPOSITÆ. Compound Pills of Rhubarb. Ed.

Take of the Root of Rhubarb, in powder, one ounce; Socotorine Aloes, six drachms; Myrrh, half an ounce; Oil of Peppermint, half a drachm. Beat them into a mass with syrup of orange-peel.

This is a moderate laxative much employed, especially in dyspeptic affections, to obviate costiveness, and stimulate gently the stomach and intestines; hence known by the name of Stomachic Pills. Two pills are taken at bedtime, and operate in general without occasioning any irritation, evacuating the contents of the intestines, without producing purging.

PILULÆ SCILLITICÆ. Squill Pills. Ed.

Take of the dried Root of Squill, rubbed to a fine powder, one scruple; Gum-Ammoniac, Cardamom Seeds, in powder, Extract of Liquorice, of each one drachm. Beat them with simple syrup into a mass.

PILULÆ SCILLÆ COMPOSITÆ. Compound Squill Pills. Lond.

Take of the Root of Squill, recently dried, and beat to powder, a drachm; Ginger Root, in powder, Hard Soap, of each three drachms; Gum-Ammoniac, in powder, two drachms. Mix the powders together; then beat them with the soap, adding as much syrup as may be sufficient to give the due consistence.

PILULÆ SCILLÆ CUM ZINGIBERE. Pills of Squill with Ginger. Dub.

Take of Squill Root in powder, one drachm; Ginger Root in powder, two drachms; Essential Oil of Anise, ten drops. Triturate them together, and form them into a mass by the addition of soap jelly.

Under the form of these compositions, which have long been officinal, and which do not differ materially from each other, squill is often given as an expectorant in dyspnœa and chronic catarrh, two pills being taken morning and evening. Any efficacy they have depends on the squill. But there appears to be no advantage in reducing so much its activity by the addition of so large a proportion of other matter; and as squill, when long kept, is liable to have its strength impaired, it is perhaps preferable that it should be given under some form of extemporaneous preparation.

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THERE are a few officinal Pills peculiar to the London Pharmacopœia.

Pilulæ cambogiæ compositæ. Compound Gamboge Pills. Lond.

Take of Gamboge in powder, Socotorine Aloes in powder, Compound Powder of Cinnamon, of each one drachm; Soap, two drachms. Mix the powders together, then, adding the soap, beat the whole into one mass.

By the addition of the gamboge to the aloes, its cathartic power is increased, and a composition afforded, more active than the aloetic pill. Two or three pills are a dose.

Pilulæ ferri cum myrrha. Pills of Iron with Myrrh. Lond.

Take of Myrrh, beat to powder, two drachms; Sub-carbonate of Soda, Sulphate of Iron, Sugar, of each a drachm. Triturate the myrrh with the sub-carbonate of soda; then having added the sulphate of iron, triturate them again; lastly, beat the whole together, until they form an uniform mass.

This is the same composition, with regard to the active ingredients, as forms the basis of the Compound Mixture of iron, and it may be occasionally convenient to prescribe it under the form of pill, or to form the mixture from it extemporaneously by diffusion in water.

Pilulæ hydrargyri sub-muriatis. Pills of Sub-muriate of Quicksilver. Lond.

Take of Sub-muriate of Quicksilver, Precipitated Sulphuret of Antimony, of each a drachm, Gum-resin of Guaiac, beat to powder, two drachms. Triturate the sub-muriate of quicksilver with the precipitated sulphuret of antimony, then with the gum-resin of guaiac, and add of copaiba as much as may be sufficient to give the proper consistence.

This, under the name of Plummer's Pill, has been used as an alterative in cutaneous diseases, in a dose of ten grains.

## CHAP. XXIV.

### TROCHISCI.—TROCHES.

Troches, or Lozenges, consist of powders mixed with mucilage, in such a proportion, that when dried they are firm and hard. While in the state of a soft paste, they are cut into small square or round tablets, and these are hardened by drying. The form is one adapted principally to such medicines as are designed to dissolve slowly in the mouth; and hence they are always rendered pleasant by the addition of a large proportion of sugar. They are seldom active remedies, but are employed principally in affections of the mouth or throat. As of little importance, they have been rejected in the Dublin and in the late edition of the London Pharmacopœia, and a few only are retained by the Edinburgh College.

Trochisci carbonatis calcis. Troches of Carbonate of Lime. Ed.

Take of Prepared Carbonate of Lime, four ounces; Gum Arabic, one ounce; Nutmeg, one drachm; Refined Sugar, six ounces. Rub these to powder, and make them into a mass with water, fit for forming troches.

This is a pleasant form under which carbonate of lime may be given as an antacid, though the quantity of saccharine matter may perhaps favour the production of acid in the stomach; and either from this, or from not being well prepared in the shops, they are little used.

TROCHISCI GLYCYRRHIZÆ. Liquorice Troches. Ed.

Take of Extract of Liquorice, Gum Arabic, of each one part; Refined Sugar, two parts. Let them be dissolved in warm water, and strained. Then evaporate the solution with a gentle heat, into a mass, which form into troches.

These, from their demulcent quality, may be used to allay coughing, in catarrh; but the simple extract of liquorice is equally effectual, and when purified by solution in water, and inspissation, so as to be of a firm consistence, forming what is named Refined Liquorice, is more grateful. Hence these troches are never used.

TROCHISCI GLYCYRRHIZÆ CUM OPIO. Liquorice Troches with Opium. Ed.

Take of Opium, two drachms; Tincture of Tolu Balsam, half an ounce; Simple Syrup, eight ounces; Extract of Liquorice, softened with Warm Water, Gum Arabic, in powder, of each five ounces. First rub the opium thoroughly with the tincture; then add gradually the syrup and the extract; afterwards sprinkle in the powder of Gum Arabic; and, lastly, dry the mass, that it may be formed into troches, each weighing ten grains.

These are the most active troches in the Pharmacopœia, and are effectual in relieving the tickling cough frequently attending catarrh. The opium is the ingredient on which their efficacy principally depends, its local operation lessening the irritation which gives rise to coughing; the others cover its taste and flavour, render the composition pleasant, and add a demulcent quality. One drachm, or six troches, contain one grain of opium; and from six to twelve may be taken in twenty-four hours. The composition would be improved, if the proportion of opium were diminished, as they would then be less ungrateful, their action would be more gradual, and a greater number could be taken. A substitute might be found too for the balsam of Tolu, the flavour of which is rather unpleasant, and which cannot be supposed to communicate any virtue.

TROCHISCI GUMMOSI. Gum Troches. Ed.

Take of Gum Arabic, four parts; Starch, one part; Refined Sugar, twelve parts. These being rubbed to powder, are to be formed into a mass, with rose water, fit for forming troches.

This composition is designed as a demulcent, but is never used; it is not very pleasant, and gum Arabic, when pure, answers the same purpose.

TROCHISCI NITRATIS POTASSÆ. Troches of Nitrate of Potash. Ed.

Take of Nitrate of Potash, one part; Refined Sugar, three parts. Beat them to powder, and, with mucilage of gum tragacanth, make them into a mass proper for forming troches.

Under this form nitrate of potash is sometimes used as a refrigerant in angina tonsillaris, and to allay the sense of heat attending salivation, and abate the inflammation, being allowed to dissolve slowly in the mouth. They do not very well retain their form, being liable to become humid, and a mixture of nitre and sugar in powder answers equally well.

# CHAP. XXV.

## LINIMENTA, UNGUENTA ET CERATA.—LINIMENTS, OINTMENTS, AND CERATES.

These are compositions of a soft consistence, having some unctuous substance for their basis, such as oil, lard, spermaceti or wax. When the consistence is so soft as to be thick, but nearly fluid, it is termed a Liniment; when it is more firm, it is an Ointment; and when still harder, it forms a Cerate. It is evident that these different degrees of consistence depend on the proportions of the ingredients. Where the oil is in large quantity, a liniment is formed, and the addition to this of a larger proportion of wax forms an ointment or cerate. The following general directions are given in the Edinburgh Pharmacopœia for their preparation.

In making these compositions, fatty and resinous substances are to be melted with a gentle heat, stirring them constantly, sprinkling in at the same time the dry ingredients, if there are any, reduced to a very fine powder, until the mixture, by cooling, become firm.

Formerly ointments were numerous and complicated in their composition, and surgeons adapted, with much formality, different ointments to answer different indications. The practice is now more simple; the principal intention in these applications is to keep the parts soft and easy, and to exclude the atmospheric air, and therefore the simplest composition that is of a proper consistence and tenacity answers the purpose. It is only in a few cases that certain substances are added to these simple compositions, with the view of obtaining peculiar effects from their stimulant, or sometimes their specific operation, or from their chemical action. The consistence of a cerate is usually the most convenient, at least for continued application, that of an ointment being rather too thin, especially as it is rendered thinner by the heat of the part applied.

LINIMENTUM AQUÆ CALCIS, *sive Oleum Lini cum Calce.* Liniment of Lime Water. Ed.

Take of Oil of Lintseed, Lime Water, of each equal parts. Mix them.

LINIMENTUM CALCIS. Liniment of Lime. Dub.

Take of Lime Water, Olive Oil, of each three ounces. Mix by agitation.

This is a saponaceous compound, formed by the mutual chemical action of the lime-water and oil. It is a thick bland fluid of a white colour, and is sometimes used as a soothing application to inflamed parts, more particularly to burns, being spread over the surface with a feather. It requires to be extemporaneously prepared, as after a little time the soapy matter separates from the water.

LINIMENTUM SIMPLEX. Simple Liniment. Ed.

Take of Olive Oil, four parts; White Wax, one part.

UNGUENTUM SIMPLEX. Simple Ointment. Ed.

Take of Olive Oil, five parts; White Wax, two parts.

CERATUM SIMPLEX. Simple Cerate. Ed.

Take of Olive Oil, six parts; White Wax, three parts; Spermaceti, one part.

These compositions differ merely in consistence. They are applied, spread on linen, as usual dressings to slight wounds and excoriations. The cerate affords the composition, which, from consistence, is best adapted to this. The following compositions, in the London and Dublin Pharmacopœias, are nearly the same, and are designed for the same purposes.

UNGUENTUM CETACEI. Spermaceti Ointment. Lond.

Take of Spermaceti, six drachms; White Wax, two drachms; Olive Oil, three fluidounces. Having melted them with a gentle fire; stir them constantly until they cool.

UNGUENTUM SPERMATIS CETI. Ointment of Spermaceti. Dub.

Take of White Wax, half a pound; Spermaceti, one pound; Prepared Lard, three pounds. Form an ointment.

CERATUM CETACEI. Spermaceti Cerate. Lond.

Take of Spermaceti, half an ounce; White Wax, two ounces; Olive Oil, four fluidounces. To the spermaceti and wax melted, add the oil, and stir them until they cool.

CERATUM. Cerate. Lond.

Take of Olive Oil, four fluidounces; of Yellow Wax, four ounces. Add the oil to the wax melted, and mix.

UNGUENTUM CERÆ FLAVÆ. Ointment of Yellow Wax. Dub.

Take of Purified Yellow Wax, a pound; of Prepared Lard, four pounds. Form an ointment.

UNGUENTUM CERÆ ALBÆ. Ointment of White Wax. Dub.

This is made in the same manner, employing only White for Yellow Wax.

UNGUENTUM RESINOSUM. Resinous Ointment. Ed.

Take of Hogs Lard, eight parts; White Resin, five parts; Yellow Wax, two parts.

CERATUM RESINÆ. Cerate of Resin. Lond.

Take of Yellow Resin, Yellow Wax, each a pound; Olive Oil, a pint. Melt the wax and resin with a slow fire, then add the oil, and strain the cerate through linen while warm.

UNGUENTUM RESINÆ ALBÆ. Ointment of White Resin. Dub.

Take of Yellow Wax, a pound; White Resin, two pounds; Prepared Lard, four pounds. Form an ointment, which, while hot, strain through a sieve.

The addition of the resin renders this considerably more stimulating than the preceding ointments. Hence it is used as a dressing where the object is to promote suppuration.

UNGUENTUM PULVERIS MELOES VESICATORII, *olim Unguentum Epispasticum fortius.* Ointment of Powder of Cantharides. Ed.

Take of Resinous Ointment, seven parts; Powder of Cantharides, one part.

CERATUM LYTTÆ. Cerate of Cantharides. Lond.

Take of Spermaceti Cerate, six drachms; Cantharides rubbed to a very fine powder, a drachm. To the cerate, softened by heat, add the Cantharides, and mix.

UNGUENTUM CANTHARIDIS. Ointment of Cantharides. Dub.

Take of Ointment of Yellow Wax, half a pound; Cantharides in powder, an ounce. Form an ointment.

This is the ointment commonly employed to establish a purulent discharge, or form a superficial issue in the part to which a blister has been applied: this it does from the acrid and stimulating quality of the cantharides, which quickly changes the serous discharge from the blister into one of a purulent nature, and by continuing the application, this may be kept up for any length of time. In preparing it, the cantharides ought to be reduced to a very fine powder.

UNGUENTUM INFUSI MELOES VESICATORII, *olim Unguentum Epispasticum mitius.* Ointment of Infusion of Cantharides. Ed.

Take of Cantharides, White Resin, Yellow Wax, of each one part; Venice Turpentine, Hogs Lard, of each two parts; Boiling Water, four parts. Macerate the cantharides in the water for a night, and strain the liquor, pressing it strongly; having added the lard, boil it until the water is evaporated; then add the wax and resin. These being melted and removed from the fire, add the turpentine.

The ointment with the powder of cantharides sometimes occasions too much pain and irritation. The composition obtained by this process is designed as a milder application, adapted in such cases to answer the same indication. The water, by infusion on the cantharides, extracts the acrid matter, but this, from being in a state of solution, is, after the subsequent evaporation, diffused through the unctuous matter in a state of finer division than the powder can be: it is also from the proportions ordered, in smaller quantity, but its stimulating quality is aided by the turpentine, and it is still sufficiently so to keep up the purulent discharge.

UNGUENTUM SUB-ACETITIS CUPRI, *olim Unguentum Æruginis.* Ointment of Sub-Acetite of Copper. Ed.

Take of Resinous Ointment, fifteen parts; Sub-Acetite of Copper, one part.

UNGUENTUM ÆRUGINIS. Ointment of Verdigrease. Dub.

Take of Resinous Ointment, a pound; Prepared Verdigrease, half an ounce, Form an ointment,

This ointment is used as a stimulant and escharotic, applied to foul ulcers, It is rather too active, and in general requires to be mixed with an additional proportion of resinous or simple ointment; nor is it used but as an occasional dressing.

UNGUENTUM HYDRARGYRI, *vulgo Unguentum Cæruleum.* Ointment of Quicksilver. Ed.

Take of Quicksilver, Mutton Suet, of each one part; Hogs Lard, three parts. Rub the quicksilver thoroughly in a mortar with a little of the lard, until the globules disappear; then add the remaining fats. It may be made also with a double or triple proportion of Quicksilver.

UNGUENTUM HYDRARGYRI FORTIUS. Stronger Ointment of Quicksilver. Lond.

Take of Purified Quicksilver, two pounds; Prepared Hogs Lard, twenty-three ounces; Prepared Tallow, one ounce. Rub first the quicksilver with the tallow and a little lard, until the globules disappear; then add the remaining lard, and mix them.

UNGUENTUM HYDRARGYRI. Ointment of Quicksilver. Dub.

Take of Purified Quicksilver, Prepared Lard, equal weights. Rub them together in a marble or iron mortar, until the globules of quicksilver disappear.

UNGUENTUM HYDRARGYRI MITIUS. Milder Ointment of Quicksilver. Lond.

Take of the Stronger Ointment of Quicksilver, one pound; Prepared Hogs Lard, two pounds. Mix them.

UNGUENTUM HYDRARGARI MITIUS. Milder Ointment of Quicksilver. Dub.

This is made with double the weight of Lard.

Of these ointments, the one always employed for mercurial friction is that formed from equal weights of quicksilver and lard. The only use of the lard is to facilitate the extinction, as it is called, of the quicksilver, and the introduction of it through the cuticle: these purposes are perfectly attained from this proportion, and any larger quantity of unctuous matter merely weakens it, and renders it necessary to continue the friction longer. For application in some cutaneous affections, the milder ointment is sometimes used. The proportion of one part of quicksilver to four of unctuous matter, ordered in the Edinburgh Pharmacopœia, gives an ointment weaker than any that is ever used or kept in the shops; and it would be preferable, therefore, to order the preparation as is done in the other Pharmacopœias.

This, like other mercurial preparations obtained by trituration, was at one time regarded as deriving its efficacy from the mere mechanical division of the metal. The reasons have been already stated for believing, that in all these preparations the mercury is oxidated, and that their action on the living system depends on this oxide. There are even additional grounds for admitting this conclusion with regard to mercurial ointment. Unctuous matter appears in general to promote the oxidation of metals by the action of the air, as is exemplified in the green crust which copper speedily acquires when coated thinly with grease: quicksilver being in a fluid state, and the surface being extended and renewed by the trituration, these circumstances are still more favourable to the same change being effected more speedily. The improvement of the ointment from keeping, affords a similar presumptive proof. The ointment is, when newly prepared, of a light bluish grey colour, but when kept for some time it becomes of a much darker colour, probably from the oxidation of the metal becoming more complete; and it has accordingly been found, that from ointment long prepared, less metallic quicksilver subsides, when it is kept liquid by the heat of a water-bath, than from ointment newly prepared. Even from the latter, only part of the quicksilver subsides in globules, the remaining quantity is in the state of a grey powder, which there is every reason to conclude is the grey oxide of the metal.

It has been supposed, that the quicksilver in the preparation may suffer a still farther change. Unctuous matter, and more especially that of animal origin, is known to become rancid from the action of the air, and this rancidity appears to be connected with the formation of an acid, probably the acid produced from fat, the Sebacic. This change may take place to a certain extent during the trituration, and still more when the ointment is long kept, and may promote the oxidation of the mercury, while any acid that is formed may combine with the oxide. According to this view, mercurial ointment will consist of unctuous matter, in which is diffused oxide and sebate of mercury, with a portion generally of metallic mercury, its activity, of course, depending on the former.

The extinction of the mercurial globules by trituration being rather a laborious process, several expedients have been contrived to facilitate it. Several of these are inadmissible, such as the use of sulphur or turpentine. In the ointment prepared with the former, the mercury is probably not in an active state; it is known by its deep black colour, and by the smell of sulphur exhaled when paper covered with it is kindled. Turpentine renders the ointment too acrid, so that when applied by friction it produces irritation on the skin or inflammation; it also can be detected by the odour exhaled in burning. Rancid fat, it has been found, extinguishes the quicksilver better than recent fat, and may be allowed, as by the action of the metal the rancidity of the fat appears to be corrected. The trituration should always be made at first with a little tallow, as lard does not oppose sufficient resistance to afford all the assistance that may be derived from the interposed matter, in facilitating the mechanical division.

Mercurial ointment is the form under which mercury is introduced into the system by external friction. It is a mode employed with advantage in cases where the preparations administered internally are liable to be too much determined to the intestines, so as to occasion griping or purging, or when it is necessary to introduce a large quantity of mercury speedily into the system; the general mercurial action being thus soon induced. It is likewise sometimes employed in some local affections, particularly bubo. One drachm of the strong ointment (that containing equal parts of mercury and lard) is introduced by friction on the skin in the evening, and frequently also in the morning, until the system is affected, the part on which the ointment is rubbed being occasionally changed to avoid irritation or inflammation. The weaker ointment ought not to be employed, as it merely gives unnecessary trouble, by the necessity of rubbing in so much lard. It is used therefore only as a dressing to ulcers, or as a local application.

UNGUENTUM OXIDI HYDRARGYRI CINEREI. Ointment of Grey Oxide of Quicksilver. Ed.

Take of Grey Oxide of Quicksilver, one part; Hogs Lard, three parts.

This is designed as a substitute for the mercurial ointment, and, as the quicksilver is fully oxidated, it has been supposed that it will prove more active and certain. It probably would have this advantage; but it has been said, that it is not easily introduced by friction, the unctuous matter passing through the cuticle without the whole of the oxide,—a difference which, if it do exist, must depend on the combination being less intimate.

UNGUENTUM OXIDI HYDRARGYRI RUBRI. Ointment of Red Oxide of Quicksilver. Ed.

Take of Red Oxide of Quicksilver by Nitric Acid, one part; Hogs Lard, eight parts.

UNGUENTUM HYDRARGYRI NITRICO-OXYDI. Ointment of Nitric Oxide of Quicksilver. Lond.

Take of Nitric Oxide of Quicksilver, an ounce; White Wax, two ounces; Prepared Lard, six ounces. To the wax and lard melted together, add the nitric oxide of quicksilver, rubbed into a very fine powder, and mix.

UNGUENTUM SUB-NITRATIS HYDRARGYRI. Ointment of Sub-nitrate of Quicksilver. Dub.

Take of Ointment of White Wax, half a pound; Sub-Nitrate of Quicksilver, half an ounce. Form an ointment.

This is applied as a mild escharotic to remove the diseased surface of ulcers, and as a stimulant to promote suppuration; and in cases of languid ulceration and chronic inflammation is often used with marked benefit. In some forms of ophthalmia much advantage is derived from it, particularly where the edges of the tarsi are raw or ulcerated, or where, from the continuance of inflammation, the vessels on the surface have become weakened, and where specks are beginning to form on the cornea; it is also useful in the scrofulous ophthalmia of children. Care ought to be taken in its preparation, that the mercurial preparation is reduced to a very fine powder. It ought also to be prepared only when it is to be used, or at least ought not to be long kept, as the mercurial oxide or rather sub-nitrate soon undergoes decomposition, which is indicated by the colour changing from a bright red to a grey.

UNGUENTUM NITRATIS HYDRARGYRI FORTIUS, *vulgo Unguentum Citrinum.* Stronger Ointment of Nitrate of Quicksilver. Ed.

Take of Purified Quicksilver, one part; Nitrous Acid, two parts; Olive Oil, nine parts; Hogs Lard, three parts. Dissolve the quicksilver in the acid; then beat up the solution strongly with the lard and oil previously melted together, and beginning to cool, in a glass mortar, so as to form an ointment.

UNGUENTUM HYDRARGYRI NITRATIS. Ointment of Nitrate of Quicksilver. Lond.

Take of Purified Quicksilver, an ounce; Nitric Acid, two fluidounces; Prepared Lard, six ounces; Olive Oil, four fluidounces. Dissolve the quicksilver in the acid; then mix the liquor, while still warm, with the fat and the oil melted together.

UNGUENTUM SUPER-NITRATIS HYDRARGYRI. Ointment of Super-Nitrate of Quicksilver. Dub.

Take of Purified Quicksilver, an ounce; Nitrous Acid, two ounces; Olive Oil, a pint; Prepared Lard, four ounces. Dissolve the quicksilver in the acid, mix in the oil and lard melted together, and form an ointment in the same manner as the nitrous-acid ointment.

In this ointment the nitrate of quicksilver is combined with the lard; and as there is also an excess of nitric acid, it acts chemically on the fat, and notwithstanding the quantity of oil used, gives to the composition a firm consistence. It forms like the preceding ointment a very excellent application in various forms of chronic inflammation, such, for example, as psorophthalmia; it is also used in different kinds of cutaneous eruption, herpetic, or connected with superficial inflammation or ulceration. It is either rubbed gently on the part affected, or where this would produce irritation, it is applied, softened by heat, by a hair pencil.

UNGUENTUM NITRATIS HYDRARGYRI MITIUS. Milder Ointment of Nitrate of Quicksilver. Ed.

This is made in the same manner as the preceding with a triple proportion of lard and oil.

This is designed to afford an application milder than the former, and also of a softer consistence; but, to obtain the latter convenience, it is better to reduce the strong ointment with the requisite proportion of lard, when it is to be used, as, from the operation of the acid, the milder ointment, even with the increased proportion of unctuous matter, is nearly equally firm as the stronger ointment.

UNGUENTUM ACIDI NITROSI. Ointment of Nitrous Acid. Ed.

Take of Hogs Lard, one pound; Nitrous Acid, six drachms. Mix the acid gradually with the melted lard, and beat the mixture thoroughly while it cools.

UNGUENTUM ACIDI NITROSI. Ointment of Nitrous Acid. Dub.

Take of Olive Oil, a pound; Prepared Lard, four ounces; Nitrous Acid, an ounce. Add the acid to the oil and the fat melted together in a glass vessel; apply a moderate heat in a water-bath for a quarter of an hour; then removing from the bath, stir constantly with a glass rod, until they become cold.

In this preparation part of the acid is decomposed, and part of it is combined with the lard. It is designed as an application in cutaneous affections, and has been said to be similar in its effects to the preceding ointment. It appears, however, considerably inferior in efficacy, and since its first introduction it has been little used.

UNGUENTUM OXIDI PLUMBI ALBI. Ointment of White Oxide of Lead. Ed.

Take of Simple Ointment, five parts; White Oxide of Lead, one part.

UNGUENTUM CERUSSÆ, sive SUB-ACETATIS PLUMBI. Ointment of Cerusse, or Sub-acetate of Lead. Dub.

Take of Ointment of White Wax, a pound; Cerusse, reduced to a very fine powder, two ounces. Form an ointment.

This has been used principally as an application to burns and superficial inflammation.

UNGUENTUM ACETATIS PLUMBI, *vulgo Unguentum Saturninum.* Ointment of Acetate of Lead. Ed.

Take of Simple Ointment, twenty parts; Acetate of Lead, one part.

CERATUM PLUMBI SUPER-ACETATIS. Cerate of Super-acetate of Lead. Lond.

Take of Super-acetate of Lead in powder, two drachms; White Wax, two ounces; Olive Oil, half a pint. Melt the wax in seven fluidounces of the oil; then add to them gradually the super-acetate of lead, rubbed down with the rest of the oil, and stir with a wooden spatula until they unite.

UNGUENTUM ACETATIS PLUMBI. Ointment of Acetate of Lead. Dub.

Take of Ointment of White Wax, a pound and a half; Acetate of Lead, an ounce. Form an ointment.

The preparations of lead have been supposed to possess a specific power in abating inflammation by local application. They are usually applied under the form of solution; but where that of ointment is preferred, this composition has been considered as preferable to any other, as containing the most active preparation of lead. It is accordingly often used as a dressing to inflamed parts.

CERATUM PLUMBI COMPOSITUM. Compound Cerate of Lead. Lond.

Take of Solution of Acetate of Lead, two fluidounces and a half; Yellow Wax, four ounces; Olive Oil, nine ounces; Camphor, half a drachm. Mix the wax melted, with eight fluidounces of the oil; then remove the mixture from the fire, and as soon as it begins to become thick, add gradually the solution of acetate of lead, and stir them constantly with a wooden spatula. Lastly, mix with these the camphor dissolved in the remaining oil.

A composition similar to this was introduced by Goulard, as a form of applying lead in ointment. It has been known by the name of Goulard's Cerate, and has been supposed preferable to the preceding ointment. It may derive some advantage as a soothing application to inflamed parts, from its soft consistence, and from the acetate of lead being diffused through it in a dissolved state.

CERATUM CARBONATIS ZINCI IMPURI, *olim Ceratum Lapidis Calaminaris.* Cerate of Calamine. Ed.

Take of Simple Cerate, five parts; Prepared Impure Carbonate of Zinc, one part.

CERATUM CALAMINÆ. Cerate of Calamine. Lond.

Take of Prepared Calamine, Yellow Wax, each half a pound; Olive Oil, a pint. Mix the oil with the wax melted, then remove from the fire, and when they begin to thicken, add the calamine, and stir constantly until they cool.

UNGUENTUM CALAMINARIS. Calamine Ointment. Dub.

Take of Ointment of Yellow Wax, five pounds; Prepared Calamine, a pound. Form an ointment.

This is the common healing cerate, Turner's Cerate as it has been named, which has long been used as a dressing to slight wounds, excoriations and ulcers. It appears to act simply by excluding the air and keeping the surface to which it is applied soft; but it is preferable to the composition of wax and oil alone, from the levigated calamine giving a degree of consistence, which is not altered by the heat of the body.

UNGUENTUM OXIDI ZINCI IMPURI, *olim Unguentum Tutiæ.* Tutia Ointment. Ed.

Take of Simple Liniment, five parts; Prepared Impure Oxide of Zinc, one part.

UNGUENTUM TUTIÆ. Tutia Ointment. Dub.

Take of Ointment of White Wax, ten ounces; Prepared Tutia, two ounces. Form an ointment.

This has been used as an application in chronic ophthalmia, but it appears to have no particular virtue.

UNGUENTUM OXIDI ZINCI. Ointment of Oxide of Zinc. Ed.

Take of Simple Liniment, six parts; Oxide of Zinc, one part.

UNGUENTUM ZINCI. Ointment of Zinc. Lond.

Take of Oxide of Zinc, an ounce; Prepared Lard, six ounces. Mix them.

UNGUENTUM OXYDI ZINCI. Ointment of Oxide of Zinc. Dub.

Take of Ointment of White Wax, a pound; Oxide of Zinc, an ounce and a half. Form an ointment.

This was introduced as a substitute for the calamine cerate, oxide of zinc being supposed a purer substance than the calamine stone. Calamine, however, acts merely mechanically in the composition, and there is no advantage in the substitution of the more expensive oxide; hence this ointment is seldom used. Sometimes it has been applied in ophthalmia.

UNGUENTUM PICIS. Ointment of Tar. Ed.

Take of Tar, five parts; Yellow Wax, two parts.

UNGUENTUM PICIS LIQUIDÆ. Ointment of Tar. Lond.

Take of Tar, Prepared Tallow, each a pound. Melt them together, and strain them through linen.

UNGUENTUM PICIS LIQUIDÆ. Ointment of Tar. Dub.

Take of Tar, Tallow, each half a pound. Strain them, melted together, through a sieve.

This stimulating ointment is sometimes applied to foul ulcers, and has been used with advantage in tinea capitis.

UNGUENTUM PICIS ARIDÆ. Pitch Ointment. Lond.

Take of Pitch, Yellow Wax, Yellow Resin, of each nine ounces; Olive Oil, a pint. Melt them together, and strain through linen.

This is applied to the same purposes as the preceding ointment, from which it differs a little in consistence, and in its smell being less strong.

UNGUENTUM SULPHURIS. Ointment of Sulphur. Ed.

Take of Hogs Lard, four parts; Sublimed Sulphur, one part. To each pound of this ointment, add of Essential Oil of Lemon, or Essential Oil of Lavender, half a drachm.

UNGUENTUM SULPHURIS. Sulphur Ointment. Lond.

Take of Sublimed Sulphur, three ounces; Prepared Lard, half a pound. Mix them.

UNGUENTUM SULPHURIS. Sulphur Ointment. Dub.

Take of Prepared Lard, four pounds; Sublimed Sulphur, a pound. Form an ointment.

Sulphur is applied under this form as a remedy in psora, the surface affected with the eruption being rubbed with the ointment.

UNGUENTUM SULPHURIS COMPOSITUM. Compound Sulphur Ointment. Lond.

Take of Sublimed Sulphur, half a pound; Root of White Hellebore, in powder, two ounces; Nitrate of Potash, a drachm; Soft Soap, half a pound; Prepared Lard, a pound and a half.

White Hellebore root has been applied with advantage in psora, and this compound ointment may perhaps prove successful in cases where the simple sulphur ointment might be more slow in its operation, or fail.

UNGUENTUM ELEMI COMPOSITUM. Compound Ointment of Elemi. Lond.

Take of Elemi, one pound; Common Turpentine, ten ounces; Prepared Suet, two pounds; Olive Oil, two fluidounces. Melt the elemi with the suet, and having removed them from the fire, mix them immediately with the turpentine and oil; then strain through linen.

UNGUENTUM ELEMI. Elemi Ointment. Dub.

Take of the Resin of Elemi, a pound; White Wax, half a pound; Prepared Lard, four pounds. Form an ointment, which strain, while warm, through a sieve.

This ointment is moderately stimulating, somewhat similar to the resinous ointment, and is applied to the same purpose, that of exciting suppuration from an ulcer.

UNGUENTUM SAMBUCI. Ointment of Elder. Lond.

Take of the Flowers of Elder, Prepared Lard, of each two pounds. Boil the flowers of elder with the lard until they become friable; then strain through linen.

UNGUENTUM SAMBUCI. Ointment of Elder. Dub.

Take of the Fresh Flowers of Elder, three pounds; Prepared Lard, four pounds; Tallow, two pounds. Form an ointment in the same manner as the ointment of savine.

The elder flowers communicate to the unctuous matter a rich green colour. Ointments and plasters thus coloured by different herbs were formerly in use, but they have been properly discarded as possessed of no useful quality, and as the easier mode of giving them a colour, by the addition of some green pigment, came to be substituted in the shops for that of boiling the unctuous matter with the fresh vegetable.

UNGUENTUM VERATRI. Ointment of White Hellebore. Lond.

Take of White Hellebore, rubbed to powder, two ounces; Prepared Hogs Lard, eight ounces; Oil of Lemon, twenty minims. Mix them.

UNGUENTUM HELLEBORI ALBI. Ointment of White Hellebore. Dub.

Take of Prepared Lard, a pound; Hellebore Root, in powder, three ounces. Form an ointment.

Hellebore is used, under this form, as an application to psora. It proves sometimes effectual, and is less disagreeable than the application of the sulphur ointment.

UNGUENTUM HYDRARGYRI PRÆCIPITATI ALBI. Ointment of White Precipitate of Mercury. Lond.

Take of White Precipitate of Mercury, a drachm; Prepared Lard, an ounce and a half. To the lard melted with a gentle heat, add the precipitate of mercury, and mix them.

UNGUENTUM SUB-MURIATIS HYDRARGYRI AMMONIATI. Ointment of Ammoniated Submuriate of Mercury. Dub.

Take of Ointment of White Wax, a pound; Ammoniated Submuriate of Mercury, an ounce and a half. Form an ointment.

This is sometimes used as a very mild escharotic, and as a remedy in some cutaneous eruptions.

CERATUM SAPONIS. Cerate of Soap. Lond.

Take of Hard Soap, eight ounces; Yellow Wax, ten ounces; Semi-vitrified Oxide of Lead in powder, one pound; Olive Oil, one pint; Vinegar, one gallon. Boil the vinegar with the oxide of lead on a slow fire, stirring constantly until they unite together; then add the soap, and again boil in a similar manner until the water is entirely dissipated: lastly, mix with these the wax previously melted with the oil; then mix with it the other ingredients, so as to form a cerate.

This composition must derive any efficacy it has, principally from the acetate of lead, formed by the boiling of the vinegar on the litharge, and it appears to be an operose process to obtain a composition which has no very particular advantage.

CERATUM SABINÆ. Cerate of Savine. Lond.

Take of the Fresh Leaves of Savine, bruised, one pound; Yellow Wax, half a pound; Prepared Lard, two pounds. Boil the leaves of the savine with the lard and wax melted together; then strain through linen.

UNGUENTUM SABINÆ. Ointment of Savine. Dub.

Take of the Fresh Leaves of Savine plucked from the stalks, and bruised, half a pound; Prepared Lard, two pounds; Yellow Wax, half a pound. Boil the leaves with the lard until they become crisp, then strain with expression; lastly, add the wax, and melt them together.

This ointment is designed as a substitute for the cantharides ointment, as an application to excite suppuration, and keep up a purulent discharge, which it is said to do without producing pain or irritation, consequences that occasionally result from the common issue ointment. It is also sometimes used, prepared from the leaves of savine, reduced to fine powder, and mixed with lard.

UNGUENTUM PIPERIS NIGRI. Ointment of Black Pepper. Dub.

Take of Prepared Lard, one pound; Black Pepper, rubbed to powder, four ounces. Form them into an ointment.

This must form a very stimulating ointment. For what purpose it is designed is not very obvious.

LINIMENTUM HYDRARGYRI. Liniment of Quicksilver. Lond.

Take of the Strong Mercurial Ointment, Prepared Lard, each four ounces; Camphor, one ounce; Rectified Spirit, fifteen minims; Water of Ammonia, four fluidounces. Rub the camphor first with the spirit, then with the lard and mercurial ointment; lastly, adding gradually the water of ammonia, mix the whole together.

This is designed as a stimulating application and discutient, to be applied to indolent tumours or collections of fluid; by its stimulant action it may promote absorption, and the mercury introduced by the friction may exert a more permanent action.

LINIMENTUM TEREBINTHINÆ. Turpentine Liniment. Lond.

Take of the Resin Cerate, a pound; Oil of Turpentine, half a pint. To the melted cerate add the oil of turpentine, and mix them together.

Oil of turpentine has been found to be a successful application to burns, and this liniment is a form under which it has been used.

# CHAP. XXVI.

## EMPLASTRA.—PLASTERS.

PLASTERS are of similar composition to ointments, but differ from them in their much firmer consistence, which is such, that they do not adhere to the hand. They owe this consistence, in general, to a larger proportion of wax, or sometimes to the addition of certain metallic oxides, particularly those of lead, which unite chemically with the unctuous matter. They require, in general, to be heated, in order to be spread: hence they adhere more firmly, and several of them even afford a mechanical support. They are employed generally to answer the same indications as ointments. The same rules are to be observed in their preparation, as in that of Ointments.

EMPLASTRUM SIMPLEX, *olim Emplastrum Cereum.* Simple Plaster. Ed.

Take of Yellow Wax, three parts; Mutton Suet, Resin, of each two parts.

EMPLASTRUM CERÆ. Wax Plaster. Lond.

Take of Yellow Wax, Prepared Tallow, each three pounds; Yellow Resin, a pound. Melt them together, and strain.

The principal use of this plaster is as a dressing to the surface to which a blister has been applied, after the vesicle has been cut. It is spread thin on linen with a hot iron.

EMPLASTRUM OXIDI PLUMBI SEMI-VITREI, *olim Emplastrum Commune.* Plaster of Oxide of Lead. Ed.

Take of the Semi-vitreous Oxide of Lead, one part; Olive Oil, two parts. Having added Water, boil them, stirring constantly, until the oil and the oxide unite into a plaster.

EMPLASTRUM PLUMBI. Plaster of Lead. Lond.

Take of Semi-vitreous Oxide of Lead, rubbed into a fine powder, five pounds; Olive Oil, a gallon; Water, two pints. Boil them with a slow fire, stirring constantly, until the oil and the oxide of lead pass into the consistence of a plaster. It is necessary to add a little boiling water, if the water added in the beginning be evaporated before the end of the boiling.

EMPLASTRUM LITHARGYRI. Litharge Plaster. Dub.

Take of Litharge in fine powder, five pounds; Olive Oil, nine pounds; Boiling Water, two pints. Mix them together, by stirring at a heat between 200° and 212°, until the oil and the litharge unite into a plaster, supplying occasionally water in fresh quantities as it evaporates.

This, which has been long known by the name of Diachylon, is a chemical combination of the expressed oil with the oxide of lead, and is of a consistence sufficiently hard to form a plaster. There is considerable attention requisite in preparing it, particularly in stirring it constantly to promote the combination, and allow of the escape of the watery vapour. The use of the water is to prevent the heat from rising too high; and if the quantity is dissipated before the combination is complete, an additional portion must be added, taking care to add it hot. The plaster is used, spread on leather or linen, as an application to excoriations, or slight wounds.

EMPLASTRUM RESINOSUM, *olim Emplastrum Adhæsivum.* Resinous Plaster. Ed.

Take of Plaster of Semi-vitreous Oxide of Lead, five parts; Resin, one part.

EMPLASTRUM RESINÆ. Resin Plaster. Lond.

Take of Yellow Resin, half a pound; Plaster of Lead, three pounds. To the plaster of lead melted with a slow fire, add the resin bruised, and mix them.

EMPLASTRUM LITHARGYRI CUM RESINA. Litharge Plaster with Resin. Dub.

Take of Litharge Plaster, three pounds and a half; Yellow Resin, half a pound. To the litharge plaster melted with a moderate heat, add the resin beat to a fine powder that it may melt speedily, and form a plaster.

The plaster of litharge is rendered more adhesive, and somewhat more stimulating, by this intermixture of resin. It is applied to similar uses.

EMPLASTRUM OXIDI FERRI RUBRI, *olim Emplastrum Roborans.* Plaster of Red Oxide of Iron. Ed.

Take of Plaster of Semi-vitreous Oxide of Lead, twenty-four parts; Resin, six parts; Yellow Wax, Olive Oil, of each three parts; Red Oxide of Iron, eight parts. Rub the red oxide of iron with the oil, and add it to the other ingredients melted.

EMPLASTRUM THURIS. Plaster of Frankincense. Dub.

Take of Litharge, two pounds; Frankincense, half a pound; Red Oxide of Iron, three ounces. Sprinkle the oxide into the plaster and the frankincense melted together, stirring them together, and form a plaster.

These plasters, spread on leather, are sometimes used as an application in slight cases of lumbago, and give some relief, merely by affording a mechanical support.

EMPLASTRUM ASSÆ FŒTIDÆ. Assafœtida Plaster. Ed.

Take of Plaster of Semi-vitreous Oxide of Lead, Assafœtida, of each two parts; Galbanum, Yellow Wax, of each one part.

This plaster is sometimes applied to the breast or side, as a remedy in hysteric affections, but probably with little advantage.

Emplasarum gummosum. Gum Plaster. Ed.

Take of Plaster of Semi-vitreous Oxide of Lead, eight parts; Gum-Resin of Ammoniac, Galbanum, Yellow Wax, of each one part.

Emplastrum galbani. Galbanum Plaster. Dub.

Take of Plaster of Litharge, two pounds; Galbanum, half a pound; Yellow Wax, four ounces. To the Galbanum melted with a gentle heat, add the litharge plaster and wax, and melt them with a moderate heat.

Emplastrum galbani compositum. Compound Galbanum Plaster. Lond.

Take of Galbanum Purified, eight ounces; Plaster of Lead, three pounds; Common Turpentine, ten drachms, Frankincense bruised, three ounces. To the galbanum and turpentine previously melted together, add first the frankincense, then the plaster of lead, melted with a slow fire, and mix them.

These three plasters are essentially the same. They are employed as discutient applications to indolent tumours, and sometimes to promote suppuration.

Emplastrum hydrargyri. Quicksilver Plaster. Ed.

Take of Olive Oil, Resin, of each one part; Quicksilver, three parts; Plaster of Semi-vitreous Oxide of Lead, six parts. Rub the quicksilver with the oil and resin melted together, and then cooled, until the globules disappear; then add gradually, the plaster of semi-vitreous oxide of lead, melted, and mix the whole carefully.

Emplastrum hydrargyri. Quicksilver Plaster. Lond.

Take of Purified Quicksilver, three ounces; Sulphurated Oil, half a drachm; Plaster of Lead, a pound. Rub the quicksilver with the sulphurated oil until the globules disappear, then add gradually the plaster of lead, melted, and mix them.

The sulphurated oil in the latter formula, causes the mercury to lose the form of globules more quickly, and therefore abridges the labour of the preparation; but it may be doubted if the quicksilver thus extinguished is in the same state of activity as when this has been done by trituration with unctuous matter alone. The mercurial plaster is applied as a discutient to indolent tumours; and it has been supposed, that from its continued application, the mercury will be absorbed, and act locally, particularly in glandular affections.

EMPLASTRUM SAPONACEUM. Soap Plaster. Ed.

Take of Plaster of Semi-vitreous oxide of Lead, four parts; Gum Plaster, two parts; Soap sliced, one part. Mix the soap with the plasters melted together; then boil a little, so as to form a plaster.

EMPLASTRUM SAPONIS. Soap Plaster. Lond.

Take of Hard Soap, cut down, half a pound; Plaster of Lead, three pounds. Mix the soap with the plaster melted, then boil down to a proper consistence.

EMPLASTRUM SAPONIS. Soap Plaster. Dub.

Take of Plaster of Litharge, three pounds; Shavings of Spanish Soap, half a pound. Mix the soap with the plaster melted with a gentle heat, then boil so as to form a plaster.

This has been supposed to possess a discutient quality; but it is much inferior to the mercurial plaster, and is scarcely ever used.

EMPLASTRUM MELOES VESICATORII, *olim Emplastrum Vesicatorium.* Plaster of Cantharides. Ed.

Take of Mutton Suet, Yellow Wax, Resin, Cantharides, of each equal weights. Mix the cantharides, rubbed into a fine powder, with the other ingredients, melted together and removed from the fire.

EMPLASTRUM LYTTÆ. Plaster of Cantharides. Lond.

Take of Cantharides, rubbed to a very fine powder, a pound; Wax Plaster, a pound and a half; Prepared Lard, a pound. Sprinkle in the cantharides to the plaster and lard melted together, and removed from the fire a little before they become solid, and mix the whole together.

EMPLASTRUM CANTHARIDIS. Cantharides Plaster. Dub.

Take of Yellow Wax, Tallow, each a pound; Yellow Resin, four ounces; Cantharides, in fine powder, a pound. Sprinkle the cantharides into the wax, tallow and resin melted together, a little before they become solid from cooling, and mix them so as to form a plaster.

This is the plaster usually employed to raise a blister, an effect produced from the action of the acrid matter of the cantharides. It is of a softer consistence than the other plasters, that it may admit of being spread without the assistance of heat, which would impair the acrid quality. It is spread on leather, and requires to be applied twelve hours to produce a perfect blister: it is then removed; the vesicle is cut, and the inflamed surface is dressed with simple cerate or plaster. In cases where it is of importance that a blister should be raised with certainty, and speedily, it is of advantage to sprinkle a little of the powder of cantharides on the surface of the plaster when spread. Washing the part previously with vinegar, is also useful to insure the effect. Camphor is sometimes mixed with the blistering composition, on the supposition that it prevents the strangury, which is sometimes produced by a large blister; but it appears to have no such virtue, and this painful symptom is more effectually obviated by the free use of diluents while the blister is applied,—a practice always proper where the system is irritable, or even in common cases where the blister is large.

EMPLASTRUM MELOES VESICATORII COMPOSITUM. Compound Plaster of Cantharides. Ed.

Take of Venice Turpentine, eighteen parts; Burgundy Pitch, Cantharides, of each twelve parts; Yellow Wax, four parts; Sub-acetite of Copper, two parts; Mustard Seed, Black Pepper, of each one part. To the Burgundy pitch and wax melted, add the turpentine. While these are melted and still warm, add the other ingredients mixed and rubbed to a fine powder, stirring constantly, so as to form a plaster.

It occasionally happens, that the common plaster of cantharides is insufficient to excite a blister, even when its surface has been sprinkled over with powdered cantharides. In such cases, or even in others where it is necessary that a blister should be quickly raised, and where the system is not easily affected, as in comatose diseases, this more powerful composition may be employed. Its operation is accompanied with a very pungent sensation of heat. The application of it ought not to be continued too long, as it might induce ulceration; and from the greater acrimony of this than of the common epispastic, still more precaution ought to be taken against the occurrence of strangury.

* * *

EMPLASTRUM AMMONIACI. Ammoniac Plaster. Lond.

Take of Gum-Resin of Ammoniac, purified, five ounces; Acetic Acid, half a pint. Dissolve the ammoniac in the vinegar; then evaporate the liquor in an iron vessel by the heat of a water-bath, stirring it until it attain a proper consistence.

Under this form, gum-ammoniac is applied as a discutient, and sometimes also as a remedy in tinea capitis; and as it is occasionally used, the London College have received it as an officinal preparation.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. Plaster of Ammoniac with Quicksilver. Lond.

Take of Purified Ammoniac, one pound; Purified Quicksilver, three ounces; Sulphurated Oil, one fluidrachm. Rub the quicksilver with the sulphurated oil until the globules disappear; then add gradually the ammoniac melted, and mix them.

EMPLASTRUM AMMONIACI CUM HYDRARGYRO. Plaster of Ammoniac with Quicksilver. Dub.

Take of Pure Gum Ammoniac, a pound; Purified Quicksilver, three ounces; Turpentine, two drachms. Rub the quicksilver with the turpentine, until the globules disappear, then add gradually the ammoniac melted, and melt them together.

This is similar to the simple mercurial plaster, its discutient and stimulant powers being perhaps somewhat promoted by the ammoniac. It is applied to the same purposes.

EMPLASTRUM CUMINI. Cumin Plaster. Lond.

Take of Cumin Seeds, Caraway Seeds, Bay Berries, of each three ounces; Burgundy Pitch, three pounds; Yellow Wax, three ounces. To the pitch and wax melted, add the other ingredients rubbed to powder, and mix them.

This has been applied to the region of the stomach as a moderate stimulant in hysteric affections and flatulent cholic, but it cannot be supposed to be of any advantage.

EMPLASTRUM OPII. Opium Plaster. Lond.

Take of Hard Opium in powder, half an ounce; Frankincense bruised, three ounces; Plaster of Lead, a pound. To the plaster melted, add the frankincense and opium, and mix them.

Opium has sometimes been used as an anodyne, by external application, with advantage, as, for example, in relieving the pain of toothach. This plaster, newly introduced into the London Pharmacopœia, is designed to afford a form of applying it, though the more usual mode of extending a piece of opium softened between the fingers on leather or silk is probably to be preferred, as even more effectual.

EMPLASTRUM PICIS COMPOSITUM. Compound Pitch Plaster. Lond.

Take of Burgundy Pitch, two pounds; Frankincense, one pound; Yellow Resin, Yellow Wax, of each four ounces; Expressed Oil of Nutmeg, one ounce. To the pitch, resin and wax, melted together, add first the frankincense, then the oil of nutmeg, and mix them together.

Burgundy pitch is in common use as a rubefacient, under the form of plaster. The addition of the other ingredients of this compound plaster may render it rather more stimulating, and the wax adds to its tenacity, and gives to the plaster a due consistence.

EMPLASTRUM CALEFACIENS. Warm Plaster. Dub.

Take of Burgundy Pitch, seven parts; Plaster of Cantharides, one part. Mix them melted together with a moderate heat, and form a plaster.

By the addition of this small proportion of cantharides, the stimulating power of the Burgundy pitch is still more increased than by the articles added in the preceding composition. This accordingly affords a very excellent rubefacient, which is frequently employed.

EMPLASTRUM AROMATICUM. Aromatic Plaster. Dub.

Take of Frankincense, three ounces; Yellow Wax, half an ounce; Cinnamon Bark in powder, six drachms; Essential Oil of Pimento, Essential Oil of Lemons, of each two drachms. Melt the frankincense and wax together, and strain. As they thicken on cooling, mix in the powder of cinnamon, rubbed with the oils, and form a plaster.

This is designed as a stomachic plaster, being applied to the region of the stomach in some forms of dyspepsia. It ought to be always extemporaneously prepared, as the essential oils are soon volatilized.

## CATAPLASMATA.—CATAPLASMS.

CATAPLASMA FERMENTI. Yeast Cataplasm. Lond.

Take of Flour, a pound; Yeast of Beer, half a pint. Mix and apply a gentle heat until the mixture begins to rise.

The yeast, mixed with the flour, and aided by the heat, soon excites fermentation, and the cataplasm in this state has been applied with much advantage as an anodyne in painful and irritable sores, and as an antiseptic in ulceration, attended with fœtor. Its efficacy depends on the carbonic acid gas evolved by the fermentative process.

CATAPLASMA SINAPIS. Mustard Cataplasm. Lond.

Take of Mustard Seeds, Lintseed, of each in powder, half a pound; Vinegar, warm, as much as is sufficient. Mix, so as to obtain the consistence of a cataplasm.

CATAPLASMA SINAPEOS. Mustard Cataplasm. Dub.

Take of Mustard Seed in powder, Crumb of Bread, of each half a pound; Wine Vinegar, as much as is necessary. Mix so as to form a cataplasm. The mustard cataplasm may be made more acrid by adding two ounces of Horse Radish Root scraped down.

The Mustard Cataplasm, or Sinapism, is the composition usually applied as a stimulant to the soles of the feet, in typhus, where there is a determination to the head, and in comatose affections. It acts as a very powerful rubefacient; its action is attended with a sense of heat and pain, which soon become urgent, and hence, when applied in a state of coma, the application ought not to be continued too long. It operates on the same principle as a blister, and differs principally in its effect being more quickly obtained, and being more powerfully stimulant to the general system, without producing the same extent of superficial inflammation.

# APPENDIX.

UNDER this Appendix I have placed some subjects connected with Materia Medica and Pharmacy, which could not otherwise be arranged with equal advantage. Mineral Waters are complicated in their composition, and, according to the substances with which they are impregnated, produce different effects on the system, and although they have certain common medicinal relations, they are hence employed to answer different indications. They are therefore not easily arranged under the classes of the Materia Medica, when these are established on analogies in medicinal operation. It is also of advantage to give a connected view of their chemical analysis, and it is on this account preferable to place them together. The Elastic Fluids that have been employed medicinally require a similar arrangement, as there is the same difficulty in placing them under the respective classes of medicines; and from the peculiarities in their preparation and mode of operation, the same advantage in giving their history in connection. I have added a few observations on the medical employment of Electricity and Galvanism, to complete the view of what properly belongs to Materia Medica. And, lastly, as connected with the subject, I have subjoined a few observations on the doses of medicines, and the rules that regulate extemporaneous prescription.

## I.—OF MINERAL WATERS.

WATERS, which flow at the surface of the earth, are frequently impregnated with foreign matter, so far as to acquire peculiar taste or odour, to be capable of exerting specific chemical actions, or to produce changes in the state of the living system. Such waters are denominated Mineral, it being usually matter belonging to the mineral kingdom which communicates these powers.

Important medicinal effects are frequently obtained from mineral waters, arising primarily from the operation of the substances which they hold dissolved, though this is no doubt aided by the state of dilution in which they are administered, the action of the water itself as a diluent, and by other external circumstances. The chemical analysis, therefore, of these waters is of importance, as determining the principles in which their active powers reside, and thus enabling the physician to employ them with more advantage and discrimination.

Mineral waters, both in a chemical classification, and considered in relation to their medicinal use, may be arranged under four orders: CARBONATED MINERAL WATERS, or those impregnated with carbonic acid gas; SULPHUREOUS MINERAL WATERS, or those impregnated with sulphuretted hydrogen; SALINE MINERAL WATERS, or those which hold certain neutral salts in solution; and CHALYBEATE MINERAL WATERS, or those, the properties of which depend on an impregnation of iron. These indeed are not perfectly insulated, but, in general, those of one division have a certain relation to those of the others, by being likewise impregnated with one or other of the ingredients which these contain. But still each may be classed according to its predominant ingredient, or that which gives it its most characteristic chemical and medicinal powers.

It would be foreign to the object of this outline, to give the minute details connected with the analysis of mineral waters. This properly belongs to a System of Chemistry. It will be sufficient to point out the general modes of analysis, or rather of discovering their principles, and to add to this chemical view, a brief account of their medicinal applications.

I. Carbonated Mineral Waters.—The waters referred to this class are those which contain carbonic acid gas; to bring them under the appellation of mineral waters, however, this must be present in such quantity as to communicate certain sensible qualities. Waters impregnated with free carbonic acid gas, sparkle when drawn from the spring, or when poured into a glass; they have a taste more or less pungent and acidulous, but become vapid from exposure to the air. Along with the carbonic acid there may be present, and, indeed, generally are present, portions of saline earthy or metallic matter, chiefly carbonates of lime, magnesia, and iron. But the carbonic acid in excess still communicates the same sensible qualities, modified, particularly with regard to medicinal powers, by these impregnations.

Carbonic acid in excess, in a mineral water, is discovered, when present in any considerable proportion, by the qualities above enumerated, communicated to the water. It is also easily distinguished, even when in more minute quantity, by chemical tests. Infusion of litmus receives from the addition of the water a red tint, which is evanescent, disappearing from exposure to the air, and more quickly when heat is applied. And lime water produces a milkiness or precipitation; the lime, when the lime water is added in due proportion, forming with the carbonic acid, carbonate of lime, which is insoluble. But the turbid appearance is removed, and the transparency restored, either by adding an additional quantity of the mineral water, the excess of carbonic acid thus communicated rendering the carbonate soluble, or by adding a few drops of nitric or muriatic acid, either of which decomposes the carbonate, and dissolves the lime. By the evanescent redness, carbonic acid is discriminated from any other free acid that a mineral water might hold dissolved; and by the precipitate formed by lime disappearing from the addition of a larger quantity of the mineral water, or of a little muriatic or nitric acid, the fallacy is guarded against that might arise from any precipitation produced by sulphates that the water might contain.

The quantity of carbonic acid contained in mineral waters is very various. Under a common pressure, pure water can absorb its own volume of the gas, but the quantity in any mineral water is generally much inferior to this. The quantity is discovered by expelling the gas from a given quantity of the water, by heating it gradually in a retort nearly filled to the neck, and receiving the elastic fluid in a graduated jar, over quicksilver: the diminution of volume it sustains, by the introduction of a solution of potash, is then observed, and this gives the volume of carbonic acid gas.

Waters highly impregnated with carbonic acid gas are grateful from their pungency, sit light on the stomach, and in a large dose produce a sensible degree of exhilaration; they increase the appetite, and generally have a diuretic effect. They prove useful in dyspeptic affections, from the grateful and moderate stimulus exerted by the carbonic acid on the stomach, aided by the diluent operation of the water, and hence the advantage derived from them in the numerous chronic affections connected with impaired power of the digestive organs, and particularly in simple dyspepsia, in hypochondriasis and gout. They generally also contain some saline substances, which communicate additional powers, and the operation of these is usually promoted, or at least they are rendered more grateful, by the carbonic acid. Those which contain carbonate of soda, as Seltzer water, prove more powerfully diuretic, and are employed with advantage, as palliatives in urinary calculus, and in the painful discharge of urine from other affections of the urinary organs. Those impregnated with iron are more particularly employed in those diseases in which that metal is beneficial. Some of the most celebrated mineral waters of Europe belong to this class, such as the Spa, Pyrmont, and Seltzer water. The Pyrmont contains very nearly its own volume of the gas; the Seltzer, more than half its volume; the Spa, rather less than half the volume: they besides hold dissolved carbonates of soda, lime, and magnesia; and the Spa and Pyrmont have a considerable impregnation of carbonate of iron. Their more minute analysis will be found in the table at the end of this article. None of the mineral springs of this country are much impregnated with carbonic acid; and those which contain any sensible quantity, as the waters of Bristol and Cheltenham, derive more activity from the presence of other substances.

II. SULPHUREOUS MINERAL WATERS.—These waters owe their distinguishing character to an impregnation of sulphuretted hydrogen, and they are at once recognised by their peculiar fœtid smell. They are transparent when drawn from the spring, but become turbid from exposure to the air, and gradually lose their odour. When strongly impregnated, they redden infusion of litmus, and even in their weakest state they give a dark precipitate with solution of nitrate of silver, or acetate of lead, and tarnish the metals.

To estimate the quantity of sulphuretted hydrogen gas contained in these waters, various methods have been employed. The gas is not easily expelled entirely by heat, nor is it easily collected, so as to measure it accurately, water absorbing it, and quicksilver decomposing it; it may also have an intermixture of carbonic acid gas, and the proportion of this is not easily ascertained, both gases being absorbed by the same liquids. The mode which has been followed is to decompose the sulphuretted hydrogen, by adding to the water, highly fuming nitrous acid, as long as there is any precipitation of sulphur. This precipitation is owing to the oxygen of the acid combining with the hydrogen of the sulphuretted hydrogen. Instead of adding the acid, Kirwan employed the method of filling a jar with the water, and mixing over it inverted, nitric oxide gas with atmospheric air, when nitrous acid is formed, and produces a similar decomposition: he supposed, that in this way the acid acts in a more concentrated state on the water. The manipulation, however, is difficult, and does not appear to have any advantage over the more simple mode of adding the fuming acid. The suphur precipitated in either mode is collected on a filter, and from its quantity, the quantity of sulphuretted hydrogen is inferred, 30 grains of sulphur being supposed to be contained in 100 cubic inches of the gas. This estimate, however, of the proportion of sulphur in sulphuretted hydrogen is somewhat uncertain, and the method is liable to some fallacy, from the action of the acid becoming weak by its dilution, so as not to precipitate the whole of the sulphur, or, if it be used in excess, from its communicating oxygen, and converting it partially into sulphuric acid.

The sulphureous mineral waters almost uniformly contain saline substances, which modify their powers. From the action of the sulphuretted hydrogen, they are employed more particularly in cutaneous affections; and from the combined action of this and the saline matter, which generally has a purgative effect, they are farther used in diseases of the digestive organs, dyspepsia, hypochondriasis, torpor of the intestines, visceral obstructions, and in scrofulous affections. They are also applied externally in cutaneous eruptions, and the warm sulphureous baths have been in particular celebrated for their efficacy under this form of application. The principal sulphureous mineral waters of this country are those of Harrowgate and Moffat: the former have a large proportion of saline matter, muriates and carbonates. Those celebrated on the Continent are chiefly the warm sulphureous springs of Aix la Chapelle, and Barege.

III. Saline Mineral Waters.—Under this class are comprised those waters in which, without any large proportion of aërial matter, various saline compounds, generally neutral, exist. The salts usually present are sulphates, muriates and carbonates; and the bases with which the acids forming these are combined are soda, magnesia and lime. Their analysis is accomplished, first, by detecting, by the employment of tests, the acids present and the bases by which these are neutralized; and, secondly, obtaining the entire salts by evaporation, or by the action of certain re-agents.

In these waters, there is often an impregnation of elastic fluid, particularly of carbonic acid, which would modify the results from the application of tests. This, after its nature has been determined by experiment, is expelled by heat, in order to facilitate the farther analysis; and in general also, it is of advantage to reduce the volume of the water by evaporation, as the operation of tests becomes then much more sensible than under a state of great dilution.

*Sulphuric acid*, in any state of combination in a mineral water, is discovered with great delicacy by muriate or nitrate of barytes, the barytes attracting it, and forming a compound not sensibly soluble, the production of which, therefore, gives rise to a turbid appearance, and precipitation. The only fallacy that requires to be guarded against is, that the same apparent results may be produced by carbonic acid present in the mineral water, either in a free or combined state; but this is easily discovered by the precipitation or turbid appearance from the action of carbonic acid being removed, by the addition of a few drops of nitric acid, or not appearing if this has been added to the mineral water previous to the addition of the muriate of barytes. Other tests of sulphuric acid have been employed, such as superacetate of lead, and nitrate of mercury; but these are both less delicate and less accurate.

*Muriatic acid* is detected by nitrate of silver, the oxide of silver combining with the muriatic acid, and forming an insoluble compound, which gives to the water first a bluish white turbid appearance, and ultimately a precipitate. This test is extremely delicate, and detects the most minute quantity of muriatic acid, in any state of combination whatever. But it is liable to fallacies, against which it is necessary to guard. The principal of these arise from the presence of carbonic acid or sulphuric acid, either of these giving rise likewise to milkiness and precipitation on the addition of the solution of silver. The operation of carbonic acid is prevented by previously adding a little pure nitric acid to decompose any carbonate: that of sulphuric acid can be obviated only by removing it by the previous addition of nitrate of barytes, as long as any precipitation is induced. If, on adding to the transparent fluid, after these preliminary experiments, the nitrate of silver, any milkiness is produced, this indicates the presence of muriatic acid. Sulphuretted hydrogen gives a precipitate with this test; but the nature of this is, from its dark colour, sufficiently evident.

*Carbonic acid*, in a combined state, is detected by muriate of barytes producing a turbid appearance, and a precipitation, which are removed by the addition of a few drops of nitric acid. Waters containing any considerable impregnation, either of alkaline or earthy carbonates, sensibly affect the vegetable colours, changing, when there is no excess of carbonic acid, or when this is removed by ebullition, the colour of Brazil wood, which is red, to a tint of blue, or restoring the blue tint of litmus which had been reddened by the addition of a little vinegar. When the water is considerably reduced by evaporation, a sensible effervescence is excited on the addition of an acid; and during the evaporation, the earthy carbonates are precipitated, while the alkaline carbonates remain dissolved, and are discovered by their power of changing the yellow colour of turmeric to a brown.

These acids are usually combined with soda, lime or magnesia; and to complete the analysis by the application of tests, these bases must be discriminated.

*Lime* is detected, with the greatest delicacy of effect, by oxalic acid. The acid indeed with which the lime is combined in the water, when evolved by the action of the oxalic acid, is liable to re-act on the precipitate, and retain it in part dissolved; but this may be guarded against by using oxalate of potash. Magnesia is precipitated by the same acid; but this can scarcely give rise to any fallacy, as this precipitation takes place very slowly, while that with lime is immediate.

*Magnesia* is precipitated by ammonia partially, and by lime water entirely; the principal fallacy to which both tests are liable is, that argil is also precipitated by them, and though this earth is not of very common occurrence in mineral waters, it is occasionally found. The best method of distinguishing them is to dry the precipitate, and boil gently a solution of potash on it, this dissolving argil, but leaving magnesia undissolved. Succinate of ammonia, it has lately been discovered, precipitates argil, but not magnesia, and forms therefore a delicate test. In using lime water as the precipitant, it is necessary to guard against the fallacy that may arise from the presence of carbonic acid free or combined, with which the lime may unite, and form a precipitate: this may be avoided by removing any carbonic acid by the previous addition of a little nitric acid. Any sulphuric acid also that may be present ought to be removed by nitrate of barytes, as it might unite with the lime, and give rise to a precipitate of sulphate of lime.

*Soda*, which is the alkaline base almost exclusively found in mineral waters, cannot be discovered by any test, such as that by which we discriminate the preceding ingredients. The presence of it, therefore, is inferred, when the analysis discovers acids in the water, which are not uncombined, and which, at the same time, cannot be inferred from the application of tests to be in combination with earthy bases. It is also discovered in its state of combination with any of the usual acids by evaporation, carried so far, that its salts are obtained crystallized. By the same method the other compound salts, those having lime, magnesia, or argil, for their base, are discovered, and hence evaporation is always employed in combination with the use of tests in conducting the analysis of a mineral water. Different substances separate at different stages of the evaporation, according to their degrees of solubility: the earthy carbonates are usually first precipitated, afterwards the earthy sulphates, at least the sulphate of lime: the clear liquor poured off and allowed to cool, affords the alkaline neutral salts and sulphate of magnesia by crystallization; the muriates of magnesia and lime usually remain dissolved in the residual liquor, and by these separations the analysis is facilitated.

Advantage is also taken of the powers of alkohol, both as a solvent and as a precipitant, to separate these substances. When the water is reduced to a concentrated state by evaporation, the addition of alkohol throws down certain salts, while others remain dissolved; and of those which are precipitated, some are thrown down by a small quantity of alkohol, or when the evaporation has not been carried far; while others are separated only when the alkohol is added in larger proportion, or when the water is farther evaporated. Thus, sulphate of lime is first precipitated, then carbonate of lime and carbonate of magnesia, afterwards sulphate of soda and sulphate of magnesia, while the muriates in general remain dissolved. In applying the solvent power of alkohol to facilitate the analysis, the water is evaporated to dryness, and this dry matter is submitted to the action of alkohol; the muriates which are present are in general dissolved, while the sulphates and carbonates remain undissolved.

By these operations, too, the quantities of the respective salts contained in a water are determined; the substances separated being either brought to a certain state of dryness, or being dissolved separately in water and crystallized. The quantities are sometimes inferred, too, by estimation from the precipitates afforded by re-agents; the quantity of sulphuric acid, for example, being determined from the weight of the precipitate of sulphate of barytes, obtained by the addition of muriate of barytes; that of muriatic acid from the weight of the precipitate of muriate of silver, obtained by the addition of nitrate of silver; and that of lime from the weight of the precipitate of oxalate of lime; these quantities being inferred according to the composition of these compounds, as they have been determined by the most accurate experiments. In general, these methods require to be combined to insure accuracy, especially with regard to the determination of proportions.

At the same time, it may be doubted, whether the view, which has usually been given with regard to the state in which these substances exist in mineral waters, is just. It has been supposed, that they are dissolved in the water in those forms of binary combination in which they are obtained by evaporation or precipitation; that if muriate of soda, for example, sulphate of magnesia, and carbonate of lime are obtained by these methods, the mineral water held these salts dissolved. Of this, however, there is no proof, and the most correct views of chemical affinity rather lead to the conclusion, that the different acids and different bases exist with their affinities balanced, contributing to mutual neutralization, in simultaneous combination, and that these binary compounds are rather formed by the processes by which they are obtained. If this view be just, the only conclusion that can strictly be drawn from the analysis is, that certain acids and certain bases exist in the mineral water, and it may appear to be superfluous to attempt to determine the quantities of the binary compounds. Still, as reducing the estimation to a standard, this is as useful as any other mode: it corresponds more directly with the results of the experiments which have been hitherto made, and we can, if it were of any advantage, infer from the quantities thus determined of the secondary compounds, the proportions of the primary principles.

Saline Mineral Waters are usually aperient, the substances which they hold dissolved being either so far as can be determined inert, such as the sulphate and carbonate of lime, or being cathartic, as the greater number of the other compound salts. It has always been remarked, too, with regard to them, that their cathartic power is greater than could be supposed from the extent of their saline impregnation, as determined by analysis;—a proof of the influence of dilution in the operation of mineral waters. They are usually employed in diseases where it is of advantage to stimulate the digestive system, the intestinal canal, and the secreting organs connected with it, or where advantage is derived from moderate and continued evacuations. Hence their celebrity in the treatment of some forms of dyspepsia and hypochondriasis, chlorosis, chronic hepatitis, jaundice, and in scrofula. The most noted saline water is that of Sedlitz: that of Seltzer, along with a portion of saline matter, has a large impregnation of carbonic acid, and that of Cheltenham, an impregnation both of carbonic acid and iron. Pitcaithly Spring, in this country, affords an example of a pure saline water, its principal ingredients being muriate of lime and muriate of soda, with a slight impregnation of carbonic acid.

When these waters are impregnated with carbonic acid, which they frequently are, they become more grateful, and sit easier on the stomach. When they have an impregnation of iron, they acquire tonic powers, and more efficacy as remedies in amenorrhœa, and the other chronic diseases in which this metal is employed: And the muriate of soda and muriate of lime which some of them contain, probably render them more beneficial in scrofula and affections of the glandular system.

Sea Water, in strict chemical arrangement, must be regarded as belonging to the glass of saline mineral waters, as it holds dissolved merely various neutral salts, chiefly muriate of soda and of magnesia, and sulphate of soda and magnesia, with a little sulphate of lime. It much exceeds, however, in the extent of impregnation, any common mineral water: the proportion of saline matter varies in different latitudes, according to the temperature, producing greater or less evaporation, and it is liable to be varied by the discharge of large rivers into the ocean. But, on an average, the quantity appears to be about $\frac{1}{29}$, of which, from the experiments of Bergman and Lavoisier, it follows, that about 20 are muriate of soda, 5 muriate of magnesia, 3 sulphates of magnesia and soda, and 1 sulphate of lime. Its medicinal powers are similar to those of the saline mineral waters; from the extent of its saline impregnation, it is more active as a cathartic, and this renders it more stimulating than fresh water as a bath.

IV. Chalybeate Mineral Waters.—These owe their characteristic properties, chemical and medicinal, to an impregnation of *Iron*. The oxide of iron is almost uniformly held dissolved by carbonic acid, the acid being usually in excess; in a few mineral waters, sulphate of iron is present; but these are not of common occurrence, and are in general too active to be well adapted to medicinal use.

Chalybeate waters have a peculiar styptic taste; they are transparent when taken from the spring, but when exposed for some time to the air, a pellicle forms on the surface, and a quantity, generally minute, of ochry sediment subsides, the water at the same time losing its taste; this change is accelerated by heat.

Iron is discovered, with great facility, by chemical tests. Prussiate of potash detects it by the blue colour to which it gives rise; infusion of galls by the purple colour which it strikes. The latter test is more delicate than the former, and it is much more accurate; the prussiate of potash being always liable to fallacy, from the difficulty of obtaining it free from iron; hence the infusion of galls, or rather the tincture of galls, ought always to be preferred. The principal circumstance to be remarked with regard to its operation, is, that the purple colour which it strikes, is liable to be altered in its tint by the presence of other substances: alkaline and earthy carbonates in particular render it violet: neutral alkaline salts appear to deepen the purple colour, and sulphate of lime renders the precipitate at first whitish, and afterwards black. Carbonate of lime has a singular effect: if the iron is in a low state of oxidation, it heightens the colour; but when the oxidation is greater, it has the opposite effect; and if the quantity of iron be small, the colour may even not appear on the addition of the test. This fact, discovered by Mr Phillips, gives the explanation of a singular circumstance with regard to the Bath Mineral Water,—that when newly taken from the spring, and while still warm, it gives a purple colour with galls, indicating the presence of iron; while, after exposure for a little time to the air, no colour appears, though no oxide of iron has been precipitated.

By applying the test of galls before and after boiling the mineral water, we are enabled to discover whether the iron is held dissolved by carbonic or sulphuric acid; the carbonic acid being expelled by the ebullition, and the oxide of iron precipitated, so that after filtration of the liquor when cold, the purple colour does not appear; while the sulphate, though likewise partially decomposed by the ebullition, still so far remains, that a colour not much fainter will be produced. The presence of carbonic or sulphuric acid may also be determined by their usual tests, and sulphate of iron may be obtained by evaporation.

The quantity of oxide of iron may be determined from its precipitation, on exposure to the air; the whole, or very nearly the whole of it, when it is combined with carbonic acid, being precipitated, in consequence partly of the escape of the acid, and partly of the iron passing to a higher state of oxidation, so that its attraction to the acid becomes weaker. It has also been estimated from the weight of the precipitate, formed by the addition of prussiate of potash; or, by a more recent and less exceptionable mode, precipitating it by the addition of succinate of soda, and afterwards decomposing the precipitate of succinate of iron, by exposing it to a red heat with a little carbonaceous matter, 100 parts of the oxide obtained by the calcination containing about 70 of iron. Benzoate of soda, which is a cheaper salt, may be used for the same purpose, 100 parts of the precipitated benzoate of iron dried by exposure to the air containing 25 of red oxide of iron.

Chalybeate mineral waters are remedies of considerable activity and power. They act as tonics, increasing the strength of the system, raising the force of the circulation, giving tone to the digestive organs, augmenting muscular vigour, and promoting the excretions. They are of course employed in those diseases in which iron is principally used, amenorrhœa, chlorosis, some states of menorrhagia, leucorrhœa, dyspepsia, scrofula, and various forms of chronic debility. And as iron always succeeds best when given in small doses, and in a state of considerable dilution, the chalybeate waters afford the best form under which it can be prescribed, that which is at once attended with least irritation, and from which the greatest benefit is obtained. The powers of these waters, too, are often aided by the presence of other ingredients. The impregnation of carbonic acid, when it is present in excess, gives them a grateful stimulant quality, which is exerted on the stomach; and saline substances communicate to them an aperient power.

One of the purest chalybeate waters, as will be perceived from the annexed table, is that of Tunbridge. In the celebrated Spa and Pyrmont waters, the impregnation of carbonic acid is so great, as very materially to modify the action of the iron; and in the Cheltenham water, the quantity of active saline matter is such, that it can scarcely be regarded as a chalybeate.

Besides the substances which have been enumerated as forming the preceding classes of mineral waters, there are some principles common to all of them, so as to be occasionally found in those of each class; and there are some also, which are of very rare occurrence, either of which scarcely require more than a concise enumeration.

*Atmospheric air* is contained in all water that flows at the surface of the earth, and renders it more grateful and light as drink. It scarcely in its entire state appears to be contained in more than the usual proportion in any mineral water, while in those in which other elastic fluids are present in large quantity, it is probably deficient. Neither does it appear that *Oxygen* gas is ever present in a proportion larger than that in which it exists, as a constituent of the atmospheric air in water. The fact, rather singular, has been established, however, that *Nitrogen* gas is afforded by mineral springs. It had often been observed, that, in the mineral spring at Buxton, a quantity of elastic fluid is discharged with the water, and a portion escapes on exposure from the water itself. This was supposed to be carbonic acid; but Dr Pearson discovered it to be nitrogen gas, mixed with a little atmospheric air, the volume of air amounting to about $\frac{1}{64}$ of the water. The same gas was afterwards discovered by Dr Garnet in the mineral waters of Harrowgate, and has since been found in others. It is probably in general derived from the oxygen of the atmospheric air, with which water is impregnated, being abstracted by other substances present in the mineral water, particularly by sulphuretted hydrogen or oxide of iron, leaving the nitrogen in combination with the water.

*Sulphurous acid gas* has been found in some hot mineral waters in the neighbourhood of volcanoes, but is scarcely to be looked for in any other situation. The *Mineral acids* have likewise, though rarely, been found uncombined, or at least in excess. *Sulphate of Argil* and *Sulphate of Iron* sometimes occur, arising probably from the oxygenation of aluminous slate impregnated with sulphuret of iron, through which the water has passed. *Muriate of Manganese* has been detected in minute quantity. Lastly, *Silex* exists in solution, especially in hot springs. It is deposited abundantly from the water of the Geyser fountain in Iceland. It is dissolved in the water of the hot springs of Carlsbad, in the Bath waters, and in many others, and is in general discovered by forming, when the water is evaporated to dryness, a residuum insoluble in acids, and having, previous to its perfect exsiccation, more or less of a gelatinous consistence.

The temperature of mineral waters gives rise to a very important distinction among them. The greater number are at the average annual temperature of the place where the spring is situated; others are considerably superior to this, or are positively warm. This modifies their powers. The warmth of the tepid waters renders them rather more stimulating when swallowed, a glow being felt in the stomach, and sometimes the head is slightly affected. When externally applied under the form of the bath, the temperature has a more important influence on their operation, than any impregnation they may have. In some celebrated mineral springs, the salutary powers appear to depend principally or entirely on the temperature, and on the water acting as a diluent, as in the warm mineral waters of Bristol, Matlock, and Buxton, and in the cold spring of Malvern.

In the following table is presented the results of the analysis of the most celebrated mineral waters. They are arranged as nearly as possible according to the preceding classes, though there is considerable difficulty with regard to some of them, which, from the substances they hold dissolved, belong to one class as well as to another. Thus the Spa and Pyrmont waters belong both to the classes of carbonated and chalybeate waters. I have placed them under the former, as the impregnation of carbonic acid is so very considerable, and gives them probably their most important properties. Cheltenham water may be placed either as a saline or as a chalybeate water. I have given it the former rank, as the saline matter appears to give it its principal activity. There are other mineral waters so free from any foreign matter that their operation must be ascribed to the fluid acting partly by its temperature, and partly as a diluent; or if in some of these the analysis indicates a certain portion of foreign matter, the substances are in general not different from those in common spring water, and are in smaller quantity, and hence cannot communicate any great degree of active power. This is the case, for example, with the Bath water, and the waters of Bristol and Buxton, in all which the impregnation of active matter is inconsiderable, and their operation seems principally dependent on dilution and temperature. These I have placed under those classes, with which, judging both from their analysis and their operation, they are most nearly connected. With regard to the temperature, I have thought it sufficient to add the epithet cold, where the temperature is not above that of the external atmosphere; where it exceeds this, the precise degrees are added. The proportions of the ingredients are those contained in a wine gallon of the water.

| WATERS. | Nitrogen. | Carbonic acid gas. | Sulphuretted hydrogen gas. | Carbonate of soda. | Carbonate of Magnesia. | Carbonate of Lime. | Sulphate of Soda. | Sulphate of Magnesia. | Sulphate of Lime. | Muriate of Soda. | Muriate of Magnesia. | Muriate of Lime. | Oxide of Iron. | Silex. | Temperature. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Carbonated. | | cub. in. | cub. in. | grains. | grains | grains. | grains | grains. | grains. | grains. | grains. | grains | grains. | grs. | |
| Seltzer, | | 138 | | 32 | 40 | 24 | | | | 140 | | | | | Cold |
| Pyrmont, | | 208 | | | 80 | 34 8 | | 44.5 | 68 6 | 12.4 | | | 4 5 | | Cold |
| Spa, | | 104 | | 11.7 | 35.3 | 11.7 | | | | 1.37 | | | 4.5 | | Cold |
| Carlsbad, | | 32 to 5 | | 39 | | 12 | 70 | | | 34.6 | | | 0.125 | 2.5 | 165° |
| Bristol, | | 30 | | | | 13 5 | 11.2 | | 11.7 | 4 | 7.25 | | | | 74° |
| Sulphureous. | | | | | | | | | | | | | | | |
| Harrowgate, | 7 | 8 | 19 | | 5.5 | 18.5 | | 10.5 | | 615.5 | 91 | 13 | | | Cold |
| Moffat, | 4 | 5 | 10 | | | | | | | 36 | | | | | Cold |
| Aix la Chap. | | | Supersulphuretted hydrogen. | 90 | | 38 | | | | 40 | | | | | 143 |
| Saline. | | | | | | | | | | | | | | | |
| Sedlitz, | | 8 | | | 21 | 6.7 | | 1444 | 41.1 | | 36.5 | | | | Cold. |
| Cheltenham, | 12. | 30.3 | 3 | | 12.5 | | 480 | | 40 | 5 | 12.5 | | 5 | | Cold. |
| Plombieres, | | | | 4.4 | | 1 | 4.7 | | | 0.5 | | | | 2.6 | |
| Pitcaithly, | | 8 | | | | 5 | | | 5.5 | 100 | | 180 | | | |
| Buxton, | 2 | | | | | 10.5 | | | 2.5 | 1.7 | | | 0.25 | | 82° |
| Chalybeate. | | | | | | | | | | | | | | | |
| Tunbridge, | 5 | 10.6 | | | | | | | 1.25 | 0.5 | 2.2 | | 1 | | Cold. |
| Brighton, | | 18 | | | | | | | 32.7 | 12.2 | 6. | | 11.2 | 1.12 | Cold. |
| Bath, | | 9.6 | | | | 6.4 | 12 | | 72 | 26.4 | | | .016 | 1.6 | 116 |

The practicability of imitating the mineral waters has engaged the attention of Chemists. With regard to the active saline waters, it is easily done, by dissolving the due proportions of the compound salts in water corresponding to the analysis of the water designed to be imitated. We may also impregnate the solution with carbonic acid gas, and even with sulphuretted hydrogen; and by the medium of carbonic acid, it might receive an impregnation of iron. Directions for conducting these processes have been given by Bergman. But in all these cases, there will be wanting the confidence on the part of the patient in the efficacy of the artificial water, which, if not necessary to its success, is at least requisite to its continued and regular use: the external advantages too, attending the visit to a mineral spring, may not always be obtained. Hence these artificial waters, designed as substitutes for the natural ones, have never been established in use. Water, impregnated with carbonic acid, with the addition of an alkaline carbonate, which is now in general use, may be considered as operating on a similar principle; and to this super-carbonated soda, or super-carbonated potash water, a small quantity of any of the purgative salts is often added with advantage, communicating to the water an aperient quality, while the taste of the salt is covered, and it is rendered more grateful to the stomach.

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## II. OF THE GASES EMPLOYED AS REMEDIES.

Substances existing in the aërial form might *a priori* be supposed capable of producing important effects on the system, as by respiration they are brought to act directly on the mass of blood, and induce in it chemical changes. They occasion too immediate and important alterations in the functions of life, some of them producing the highest excitement, others occasioning depression and exhaustion of power. And in the classes of aërial substances, we have actually the two extremes of stimulant and sedative power, in the examples of nitrous oxide and carburetted hydrogen.

Though the expectations that were at one time formed, with regard to their medicinal efficacy, have not been realized, and the use of them has now been nearly relinquished; yet since they are capable of producing such changes in the state of the functions, and of the general system, and since the proposition must be admitted, that every substance possessed of these powers may be capable of producing medicinal effects, they ought not to be entirely lost sight of, and a few observations on their operation are necessary to complete the history of the Materia Medica. There are some applications too of their chemical agency applied to medicinal purposes, which require to be taken notice of.

The modes of preparing these gases are, in a great measure, peculiar to each of them. The manner of administering them is nearly the same. They may be breathed from a jar placed in water; but this is laborious, from the effort required to sustain the column of water within the jar. This may be partly remedied, by poising the jar in water, or, more completely, by breathing from the gazometer. But the easiest mode is, for the patient to breathe the gas from a silk bag, to which a tube with a stop-cock is affixed.

The gases that have been employed in medicine may be considered under the divisions of those which *excite*, and those which *depress* the functions of life. To the former order belong,

GAS OXYGENIUM. Oxygen Gas.
GAS OXIDUM NITROSUM. Nitrous Oxide Gas.

OXYGEN gas is procured from black oxide of manganese by heat. A quantity of the oxide is put into an iron retort, connected by a tube with a gas holder, or a large jar filled with water, inverted and placed on the shelf of the pneumatic trough. The retort is exposed to a full red heat; at this temperature the affinity of the oxygen to the manganese is so far weakened by the repulsive agency of the caloric, that a large portion of it is separated from the combination, and assumes the elastic form: the gas is transmitted through water, and is allowed to stand over it for some hours before it is breathed.

As oxygen is so immediately necessary to the support of life, it might be supposed, that when afforded in a more pure and concentrated state than that in which we breathe it in atmospheric air, it would prove a salutary agent of no inconsiderable power. To this inference, however, independent of any experience, an objection occurs, from the fact, which, on some experiments made by Lavoisier, and repeated by Davy, appeared to establish, that when animals are supplied with pure oxygen, or with oxygen mixed with a portion of atmospheric air, less of it is consumed than in ordinary respiration. This result appears, however, to have arisen from some fallacy in the experiments. Seguin, in subsequent experiments, found that the consumption of oxygen gas, when it is breathed pure, is at least equal to its consumption in ordinary respiration. And Messrs Allen and Pepys found that in breathing pure oxygen gas, more of it is consumed in a given time, and more carbonic acid formed, than in breathing atmospheric air. The positive action of oxygen, in the respiration of it, in its undiluted form, is also shewn by the effects which result from its inspiration, and still more unequivocally by the fact ascertained by Priestley, Lavoisier, and Davy, that animals confined in air, with an increased proportion of oxygen, die before it is exhausted, and even while the air which they breathe contains more oxygen than common air, so that it can enable another animal to live. It is obvious, therefore, that the animal dies not from deprivation of oxygen, but from some positive power the gas exerts, and probably, as may be inferred, from some appearances which present themselves, from its too highly stimulating power.

Oxygen, when respired, acts partly by communicating a stimulating quality to the blood, by which the left side of the heart and the arterial system are excited to action: hence, when its supply by respiration is suspended, the contractions of the heart become feeble, and at length cease, as Goodwyn demonstrated. The phenomena of asphyxia from its abstraction, prove that it likewise exerts some other operation more immediately subservient to the functions of life; for in that disease the functions of life are suspended, while the contractions of the heart still continue, to a certain extent, as the experiments of Coleman have shewn.

The diseases in which oxygen gas has been administered, are principally those of chronic debility,—chlorosis, asthma, scrofula, dropsy, paralysis, and some cutaneous affections. It requires to be diluted with from ten to twenty or more parts of atmospheric air, increasing the proportion of oxygen according to the effects produced. From one to two quarts of oxygen are given, by breathing it in its diluted state, at intervals, in the course of the day. It generally increases the force and velocity of the pulse.

Nitrous oxide gas.—This gas, a compound of oxygen and nitrogen, in the proportion of 37 of the former to 63 of the latter, is most economically obtained, and in greatest purity, from the decomposition of nitrate of ammonia by heat. When this salt is exposed to a temperature about 400° of Fahrenheit's scale, its principles re-act on each other, and enter into new combinations. The hydrogen of the ammonia attracts part of the oxygen of the nitric acid and forms water; and the remaining oxygen combining with the nitrogen, both of the acid and of the ammonia, forms this particular compound, nitrous oxide, which is disengaged in the gaseous form. After its production it requires to stand some hours, to deposite a small portion of saline matter, before it is fit to be breathed.

The effects of nitrous oxide gas on the system, when it is respired, are scarcely analogous to those of any other agent. The excitement which it produces is extended to the functions of body and mind with more rapidity and force than that arising from the action of the most powerful stimulants. It is accompanied, too, with effects as various as they are peculiar; it excites usually a peculiar thrilling of the body, with feelings of pleasure not easily described: muscular vigour is increased, so that unusual exertions are made with alacrity and ease, and there is even an irresistible propensity to strong muscular exertion; the mind is also affected: there is usually a high degree of exhilaration, yet even when this is greatest, perfect consciousness remains. What still more marks the singularity of its operation, this high excitement of the functions of life and exhilaration of mind is not followed by proportional languor or debility; the state of the system gradually returns to the healthy standard, without any apparent waste of power. A substance capable of acting in such a manner, we might suppose, would prove one of our most valuable remedies. The transient nature of its operation must undoubtedly limit its medicinal efficacy; but still, in diseases of extreme debility, we seem justified in expecting from its administration the most beneficial effects. It has not, however, been very extensively employed.. In paralysis it has been used with advantage. In diseases of increased sensibility, it may prove hurtful; and when breathed by delicate females, it has, in more than one case, induced hysteric affections. The dose which is requisite to produce its peculiar effects varies from four to nine quarts, which may be breathed pure or diluted with an equal part of atmospheric air. It cannot be breathed undiluted for more than four minutes and a half, insensibility being induced. And it requires to be attended to in its administration, that its effects are considerably different in different individuals. On some, its operation has even been productive of unpleasant consequences,—palpitation, fainting, and convulsions.

Nothing satisfactory can be said as to its mode of action, since we know so little of the connection which subsists between the phenomena of life and the chemical changes which are carried on in the system. The experiments of Davy appeared to prove, that it is absorbed by the blood when respired; but, admitting this, we can discover nothing connected with its composition or chemical agency which can lead us to any explanation of its peculiar effects. We can therefore only mark the dissimilarity of its operation to that of any other physical agent.

UNDER the second subdivision of the Gases,—those which depress the functions of life, might probably be placed all the substances existing in the aërial form, oxygen and nitrous oxide excepted. The following are those which have been applied to medicinal purposes.

GAS HYDROGENIUM. Hydrogen Gas.
GAS NITROGENIUM. Nitrogen Gas.
GAS HYDROGENIUM CARBURETUM. Carburetted Hydrogen Gas.
GAS ACIDUM CARBONICUM. Carbonic Acid Gas.
GAS ACIDUM MURIATICUM. Muriatic Acid Gas.
GAS ACIDUM NITROSUM. Nitrous Acid Gas.
GAS ACIDUM OXYMURIATICUM. Oxymuriatic Acid Gas.

HYDROGEN GAS is most easily procured by the action of diluted sulphuric acid on iron or zinc; but as a little acid vapour might be diffused through it, it has been supposed preferable to obtain it, when it is designed to be breathed, by passing water in vapour over pure iron heated to the temperature of ignition. The iron attracts the oxygen of the water, and the hydrogen assumes the aërial form.

Hydrogen gas received into the lungs does not appear to exert any positive deleterious power: all its effects seem referable merely to the exclusion of oxygen. The respiration of it can accordingly be continued for some time, if it is mixed with a portion of atmospheric air, without any deleterious effect. In a pure state, however, if the lungs have been previously emptied as much as possible of atmospheric air, it cannot be breathed but for a very short time. It quickly occasions a giddiness and sense of suffocation; the countenance becomes livid, and the pulse sinks rapidly, and a state of insensibility is soon induced. When diluted with two-thirds or an equal part of atmospheric air, it can be safely breathed; nor does it appear to produce any very important effect. It occasions some diminution of muscular power and sensibility, and a reduction of the force of the circulation. It has been respired, diluted usually with four or five parts of atmospheric air, in catarrh, hæmoptysis, and phthisis; but its powers seem merely those of a palliative, dependent on the partial exclusion of the stimulating power of oxygen.

NITROGEN.—What has been said of hydrogen applies likewise to nitrogen. It seems to exert no positive action on the system, but to produce any effects arising from its inspiration merely by excluding oxygen. As it is not so easily obtained pure as hydrogen gas, it has scarcely, if at all, been employed.

CARBURETTED HYDROGEN GAS.—The gas which has been used in medicine under this name is obtained by passing the vapour of water over charcoal at the temperature of ignition, in an iron tube. The oxygen of the water unites with one part of the charcoal, forming carbonic acid; the hydrogen combines with another part of it, and forms this species of carburetted hydrogen. The carbonic acid is abstracted by agitating the gas in lime water.

This is the most active of those gases which operate by depressing the functions of life, and is perhaps the most powerful agent of this kind. Even when largely diluted with atmospheric air, it occasions immediate vertigo, sickness, diminution of the force and velocity of the pulse, reduction of muscular vigour, and in general every symptom of diminished power. It can scarcely be breathed in an undiluted state. Mr Davy found, that at the third inspiration, total insensibility was induced, and symptoms of extreme debility continued for a considerable time. These effects prove its positive deleterious agency.

As a medicinal agent, it is the gas of which the evidence in favour of its efficacy is greatest. In phthisis, in many cases, it unequivocally relieved the symptoms, and at least arrested the progress of the disease; and in diseases of increased action or increased power, much benefit might, from its known operation, be expected from its use. Much caution was found to be requisite in the trials that were made of it, with regard to the dose. At first, one point of the carburetted hydrogen gas, diluted with twenty parts of atmospheric air, may be respired: the quantity may be slowly increased, and with less dilution, taking care to avoid the production of great vertigo or muscular debility. Not more than from two to four quarts can be taken in the day, even when the patient has been accustomed to it for some time. It is always more powerful when recently prepared, than when it has been kept for some days, a circumstance requiring to be attended to in the regulation of its dose.

Carbonic acid gas.—This gas is easily procured from the action of diluted sulphuric or muriatic acid on carbonate of lime (chalk or marble); but to obtain it in a proper state of purity for breathing, it is preferable to decompose the carbonate of lime by exposure to a strong red heat in an iron bottle. The carbonic acid which is disengaged is collected over water, as it is not immediately largely absorbed by that fluid, and any vapour diffused through it is speedily condensed.

This acid gas, when it is inspired, proves more speedily fatal than nitrogen or hydrogen. It appears, from Davy's experiments on its respiration, to excite spasmodic contraction of the epiglottis, so as to induce suffocation; and it has this effect, even when diluted with nearly an equal part of atmospheric air. Yet the operation of it is more speedily fatal than that of any other agent that acts by occasioning merely suffocation, which would lead to the supposition that it acts by some positive power,—a supposition confirmed too by the fact, that in animals, in whom the symptoms of life have been suspended by its respiration, the irritability of the heart is entirely destroyed.

The respiration of carbonic acid gas was employed at an earlier period than that of the other gases, and sanguine expectations were formed of it as a remedy in phthisis. In the many cases, however, in which it has been tried, though it frequently proved useful for a time, by lessening the expectoration, diminishing the hectic fever, and acting as an anodyne, there is little evidence of its having ultimately effected a cure. The difficulty, indeed, of employing this and all the other gases, is, that of obtaining their continued operation. In that state of disease existing in the lungs, in the earlier stages of phthisis, much advantage, for example, might probably be derived from the continued respiration of a reduced atmosphere, while little can be expected merely from its occasional operation. Carbonic acid gas, when employed, was respired diluted with four or six parts of atmospheric air. It has been found, in that irritable state of the lungs, in which cough and dyspnœa are excited from the application of cold, to be attended with considerable advantage when it is breathed in a diluted state; and an easy mode of employing it with this view, is, to put a mixture of chalk or marble with diluted sulphuric acid and water into a large glass bottle, so that it shall occupy a depth only of a few inches. The carbonic acid gas is extricated, and forms an atmosphere mixed with atmospheric air in the upper part of the vessel, which may be breathed by introducing a glass tube to about the middle of the bottle, and inspiring from it.

Carbonic acid has likewise been employed as a local application to cancer and painful ulceration, and has at least been serviceable as a palliative. A stream of it is directed on the part by means of a flexible tube, taking care to transmit the gas previously through water, if it has been obtained by the action of an acid on carbonate of lime, and confining it for some time over the sore by a funnel connected with the tube. A cataplasm, formed of substances in a state of fermentation, has, in some measure, a similar effect, and is more convenient in its application. A formula for this preparation has now a place in the London and Dublin Pharmacopœias, and has been already noticed.

The three last gases which I have enumerated, Nitrous Acid Gas, Muriatic Acid Gas, and Oxymuriatic Acid Gas, require notice under this section only as having been applied to one medicinal purpose,—that of neutralizing or destroying noxious or contagious effluvia. These effluvia are probably evolved by chemical processes, and must consist of principles in forms of combination subject to chemical agency, and capable of being subverted by its exertion. It has accordingly been found, that the air of places offensive from the presence of such effluvia is corrected, and its freshness restored, by the diffusion of those acid gases, the operation of which, in changing the chemical constitution of compound elastic fluids, is most powerful.

GAS ACIDUM MURIATICUM. Muriatic Acid Gas.

The vapours of vinegar raised by heat, and the vapours of sulphrous acid disengaged in the burning of sulphur or the deflagration of sulphur and nitre, had long been employed as the most active means of fumigation. Dr James Johnston at an early period, 1758, had proposed muriatic acid, but little attention appears to have been given to the proposal. In 1773, Guyton Morveau employed it on a large scale, the use of it having been suggested to him by an hypothesis he had formed of the nature of those noxious effluvia which arise from the decomposition of animal matter. The atmosphere of the Cathedral Church at Dijon had become extremely offensive and noxious, from exhalations from cemeteries within the church; and the methods of fumigation at that time usually practised had been employed without any advantage. Morveau supposed, that the putrid odour of these effluvia must arise from the ammonia which is abundantly formed in the decomposition of animal matter, combined with a small portion of acrid oily matter formed in the same process. To neutralize this impregnation, a volatile acid, which should be capable of being diffused easily through the air, seemed to be most proper, and this led to the employment of the muriatic acid gas. A mixture of sea salt and sulphuric acid, supported over burning fuel, was placed in the body of the church, the doors being closed for twelve hours. When opened at the end of that time, the putrid odour was entirely gone. In some subsequent trials in prisons, and other situations, the same method proved equally successful. The vapour of the acid might perhaps, by some operation similar to that which Guyton supposed, lessen or remove the putrid odour; but it can scarcely be supposed capable of destroying noxious effluvia, as, of all the acids, it is the one which, from being unable to impart oxygen, is least powerful in subverting the combination of compounds, consisting of elements such as those which must be supposed to enter into the composition of elastic fluids disengaged in the putrefaction of animal or vegetable matter. And other gases having since been employed, much more active in this respect, muriatic acid gas is now scarcely employed.

GAS ACIDUM OXYMURIATICUM. Oxymuriatic Acid Gas.

After the discovery of oxymuriatic acid, its energy of chemical action being obviously so much greater than that of muriatic acid, it was applied by Cruickshank, who shewed by experiment the rapidity with which it acts on compound elastic fluids, to the purpose of fumigation. When it is mixed with sulphuretted hydrogen, phosphuretted hydrogen, or any of the varieties of carburetted hydrogen gases, it decomposes them rapidly by imparting oxygen; and though these gases may not in a pure form be evolved in the spontaneous decomposition of vegetable and animal matter, the deleterious exhalations which arise from this process must in every probability consist of elastic fluids of similar constitution: there is reason therefore *a priori* to believe, that they will be neutralized and destroyed by the oxymuriatic acid gas. It has accordingly been established by Guyton's experiments, that air tainted with a putrid odour, by exposure to substances in a state of putrefaction, has this odour removed by its action; and in the subsequent applications of it to destroy deleterious and contagious effluvia, its superior power appears to have been sufficiently established.

Oxymuriatic acid gas is applied to the purpose of fumigation by disengaging it by the usual process. Four parts of muriate of soda, one of black oxide of manganese, two of sulphuric acid, and one of water, may be mixed in an earthen pipkin, which is to be placed in a sand bath over a charcoal fire, and placed in the apartment designed to be fumigated, the doors and windows being closed. After a few hours the air may be admitted, and ventilation established, to remove completely the vapours of the oxymuriatic gas.

GAS ACIDUM NITROSUM. Nitrous Acid Gas.

The application of nitrous acid gas to the purpose of fumigation, was principally introduced by Dr Carmichael Smyth. In energy of chemical action, it is much inferior to oxymuriatic acid gas, and is probably, therefore, inferior to it in the power of destroying noxious or contagious effluvia. The evidence brought forward by Dr Smyth seems to prove, however, that it has considerable activity, and that fumigation with it is successful in restoring the purity of a corrupted atmosphere; and it has the very important advantage, that being free from the intolerable suffocating odour of the oxymuriatic gas, and free from its deleterious action on the lungs, fumigation with it in the wards of an hospital or ship, where the sick cannot well be removed, may be had recourse to without inconvenience. It is applied by mixing two parts of nitre in powder and one part of sulphuric acid, placing this mixture in warm sand, and renewing the heat occasionally as long as any vapours continue to be exhaled. Several small vessels containing a few ounces of this mixture are placed in the apartment.

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## ELECTRICITY.

THE medicinal operation of electricity may be referred to its stimulating power. It produces forcible contractions in the muscular fibre; excites therefore to action, if duly applied, and, when in excess, immediately exhausts irritability. As a stimulant it possesses the important advantages of being easily brought to act locally, and of being limited to the part to which it is applied, without at all affecting the general system, while it can also be employed in every degree of force.

Electricity is applied medicinally under the form of the stream or continued discharge of the fluid, under that of sparks, and under that of a shock; the first being the most gentle, the second being more active, and the last being much more powerful than either of the others. The electric stream is applied by connecting a metallic wire, or, what is better, a pointed piece of wood by a chain, with the prime conductor of the electric machine, and holding it by an insulated rod one or two inches distant from the part to which it is to be directed, while the machine is worked. An impression is felt similar to that of a current of air, and a very moderate stimulant operation is thus excited, which is better adapted to some particular cases than the more powerful spark or shock. The spark is communicated by applying a metallic knob connected with a rod in communication with the machine, the operator holding the rod by a glass handle, and bringing the knob within the distance of half an inch, an inch, or two inches from the part to which the spark is intended to be applied; or, what some have considered as a preferable mode, the patient is placed on an insulated stool, holding a chain connected with the prime conductor, and, while the machine is worked, a metallic knob is brought by the operator within a similar distance of the part from which the spark is to be taken; a sensation somewhat pungent is excited, and slight muscular contractions may be produced; these effects being greater or less, according as the spark is more powerful, this being regulated by the distance at which the knob is held, if the machine be sufficiently in action. The shock is given by discharging the Leyden phial, making the part of the body through which it is intended to be transmitted part of the circuit, a chain for example connected with the external surface of the coated jar, being applied to the shoulder, when the shock is to be sent through the arm, and the knob of the rod communicating with the inner surface of the jar being applied to the wrist. The shock is of course stronger as the phial is large, and as it is fully or partially charged; the sensation it excites is unpleasant, and the muscular contractions considerable, if it is of moderate intensity.

At the first introduction of electricity as a remedy, it was very highly celebrated for its efficacy in a number of diseases; its use is now confined to a few. In paralysis it is not unfrequently had recourse to, to excite muscular contraction, and perhaps with some advantage. It is usually applied under the form of sparks, the application of it requiring to be continued daily for a considerable time. Sometimes moderate shocks are also employed; but the propriety of this practice is doubtful. In amenorrhœa, as the stimulant operation can be excited, in some measure, in the vessels which are affected, advantage may be derived from electricity; and it is occasionally used, both under the form of sparks taken from the pelvis, and that of moderate shocks transmitted through it. Ophthalmia, and some other varieties of inflammation, have been removed by the electric stream; it has also sometimes succeeded in discussing tumours, and relieving pain. The general rule for the medical employment of electricity is to apply it at first under the milder forms, and gradually to raise it, if necessary, to the more powerful, taking care only not to employ it in too high a state of intensity, but in the greater number of cases rather to expect advantage from its continued and moderate use. In the treatment of paralysis, for example, by the application of electricity, the only rational indication is to excite moderate muscular action with the view of increasing the muscular power; to this, sparks of sufficient strength are adequate, and in employing shocks, there is always some risk of exhausting the irritability of the part through which they are transmitted.

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## GALVANISM.

THE peculiar power which is generated when two metals moistened or acted on by certain chemical liquids are in contact, at first named Animal Electricity, since Galvanism, has been applied as a remedy in various morbid affections. Its effects on the animal system are such as warrant this application. Its activity is shewn by its exciting, when applied in sufficient intensity, strong sensations in sensible parts, and contractions in parts endowed with irritability, more powerful than what are exerted by any other stimulant.

Between galvanism and electricity there are so many points of resemblance, that they have been considered as ultimately the same power, and there is every reason to admit their identity. Still from the different states in which they exist, their effects on living matter are not precisely similar. The sensation which galvanism excites, though somewhat analogous to that produced by electricity, is dissimilar; and the action of galvanism appears to be more extended, both to the nervous and muscular systems, than that of electricity, which is more local in its action. The galvanic excitation produces sensations and contractions in parts, which, from disease, or temporary suspension of power, are not sensible to electrical impressions; and the stimulant power which both exert, appears in galvanism to be greater in proportion to its intensity than in electricity; or the sensations and muscular contractions which the galvanic discharge excites, are more than proportional to its power of producing electrical phenomena. Hence it is the most delicate test by which the presence of irritability can be detected.

The diseases in which galvanism has hitherto been employed, are principally those of the nervous kind. In paralysis, it has been affirmed to have restored the capability of muscular contraction, and consequently the power of motion. Cases of chorea, tetanus, and some other spasmodic affections, have been related, in which perfect cures were accomplished by its application. It appears, in several instances, to have relieved deafness, particularly that species of it arising from torpor of the auditory nerve; and it has been successful in discussing indolent tumours. The transient nature of the operation is, with regard to it, as well as electricity, an obstacle to their advantageous application: it is also more difficult to apply galvanism in a high degree of intensity, than it is to apply electricity. The former, however, has been affirmed to have succeeded in some cases in which the latter had failed; and even admitting their similarity of action, it affords a method of varying the application, which is often of importance in the protracted use of a remedy.

Galvanism is applied by connecting two metallic wires with the two extremities of a galvanic battery, and bringing them in contact with the part affected, so that it shall form part of the circuit of the galvanic discharge: the one wire is kept in contact with the part it touches; the other is alternately applied for a moment, and removed, and this is continued for some time. If the skin is moistened, the galvanic influence is communicated more readily and effectually; and still more so if a small piece of metallic leaf, as tinfoil, be laid on the parts to which the wires are applied. Sometimes even the cuticle has been previously removed by a blister, but the application of the galvanism is then attended with pain, and this is altogether unnecessary, if a galvanic apparatus of sufficient power be employed. One constructed of plates of zinc and copper, four inches square, and including from 25 to 50 of each metal, is sufficient for the greater number of purposes, a greater or less number of the plates being included in the circuit, according to the strength of the application required. The liquid best adapted to excite it is a solution of muriate of soda, with a little muriatic acid; diluted nitric acid, though more powerful, having its power sooner exhausted, and its action being attended with an effervescence, and a disengagement of nitrous gas.

## ON MEDICAL PRESCRIPTIONS.

THE principal objects designed to be attained by the Composition of Medicines, are, to communicate an agreeable taste or flavour; to give a convenient form; to correct the operation of the principal medicine, or obviate some unpleasant symptom it is liable to produce; to promote its action, by the substance combined with it exerting one of a similar kind; to obtain the joint operation of two remedies, which have different powers, but which may be required to obviate different morbid symptoms which are present together; or, lastly, to change the usual effects of the substances mixed, and obtain a remedy different from either, by the power which one may have of modifying the action of another. Some of these effects are highly important, and often establish the propriety of conjoining different medicines in one formula.

A prescription has been usually divided into four parts, which compose it,—the *basis*, or principal ingredient of the prescription; the *adjuvans*, or that which is designed to promote the action of the former; the *corrigens*, or that intended to correct its operation, or obviate any unpleasant symptom which it may be apt to produce; and the *constituens*, or the substance which gives to the other ingredients consistence or form. These are not necessarily present in every formula, as some of these purposes may not require to be attained; nor is the division of much importance, except perhaps as affording the best general rule for regulating the order in which the ingredients of a prescription should be enumerated, the order being conformable to that which corresponds with this arrangement.

The following are the principal circumstances to be attended to in forming a prescription; and the observation of which may guard against the errors liable to be committed in the composition of medicines.

1*st*, Simplicity should be attained, so far as is consistent with the objects of the prescription. Nothing ought to enter into the composition which does not add to its virtue, render it less ungrateful, give it a convenient form, or which is not necessary to conceal any particular ingredient; and, in general, the practice of accumulating a number of articles in one prescription is to be avoided, as there is always the risk of one counteracting or modifying the action of another; at least, the addition of less active substances can do little more than add to the bulk of the principal medicine, or cause it to sit uneasy on the stomach.

2*dly*, Substances, it is evident, ought not to be mixed together, which are capable of entering into chemical combination, or of decomposing each other, unless it be with the view of obtaining the product of the combination, or decomposition, as a remedy. Errors with regard to this are most likely to occur in mixing together saline and metallic preparations.

3*dly*, Those mixtures are also to be avoided, in which one medicine, by its peculiar action on the stomach or general system, modifies and changes the action usually exerted by another, unless where the object is to obtain the effects of that modified operation.

4*thly*, The error of contra-indication is to be guarded against, or those medicines ought not to be combined, the virtues of which are not merely different, but are, in some measure, opposed to each other,—an error not very likely to occur with regard to the principal ingredients of a prescription, but which may happen sometimes to a less extent with regard to those of inferior importance.

*5thly*, The ingredients which are to be combined, must be such as will mix properly together, so that the form in which the remedy is designed to be exhibited may be easily obtained and preserved.

*Lastly*, The form under which a medicine is prescribed must be adapted to certain circumstances; principally to the nature of the disease, the nature of the remedy itself, and, as far as can be conveniently attained, to the taste of the patient. Those medicines which are nauseous, which operate in a small dose, or are designed to operate slowly, or which have a considerable specific gravity, are usually given under the form of pill, or sometimes of bolus. Those which are less ungrateful, or the operation of which is designed to be immediately obtained, are given in the form of electuary, or under some liquid form. Tinctures always require to be diluted: infusions or decoctions may in general be given in the state in which they are prepared. These last are always of extemporaneous preparation, and the proper application of them to individual substances must depend on the chemical properties, and chiefly on the solubility in the menstruum of the active principles of these substances.

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THE Doses of Medicines are not reducible to any general rules, from their general similarity of operation, or any other circumstance, and are therefore specific with regard to each substance. But there are certain general circumstances by which their operation is influenced, which require to be attended to in apportioning the dose. The most important of these are, Age, Sex, Temperament, Idiosyncrasy, Habit, and Disease.

*Age.*—From infancy to manhood, a larger dose of any medicine is requisite to produce its effect, in proportion to the advance in life. From manhood to old age, it has been supposed, that there is a similar gradation with regard to diminution of dose; but this is undoubtedly in a much less proportion than that which regulates the increase. The following table given by Gaubius has been supposed to shew these proportions, with regard to the early periods of life in which the necessity for the diminution of dose is unquestionable.

## TABLE.

Let the dose for a person of middle age be 1 or i drachm.

For one from xiv to xxi years, it will be.... $\frac{2}{3}$ or 2 scruples
———— vii to xiv........................ $\frac{1}{2}$ or half a dr.
———— iv to vii........................ $\frac{1}{3}$ or 1 scruple
—— of iv years of age................... $\frac{1}{4}$ or 15 grains
———— iii ————.................... $\frac{1}{6}$ or half a scr.
———— ii ————.................... $\frac{1}{8}$ or 8 grains
———— i ————.................... $\frac{1}{12}$ or 5 grains

*Sex.*—Women, in general, require rather smaller doses of any active medicine than men,—a difference which is probably owing principally to their greater sensibility from their habits of life.

*Temperament.*—By temperament is understood a predisposition, derived from original conformation, to be affected in a peculiar manner by external causes acting on the system; and much laborious investigation has been bestowed in distinguishing the different temperaments, and the diversities to which they give rise. With regard to their influence in the operation of medicines, those of the sanguine temperament are supposed to be more easily affected, and therefore to require smaller doses than those of the phlegmatic or melancholic. In what has been said, however, on this subject, there is so much uncertainty and hypothesis, that little reliance can be placed on it.

*Idiosyncrasy.*—This denotes that disposition in individuals, unconnected with general temperament, to be affected by certain causes, in a manner different from the generality of mankind. Such idiosyncrasies are observed to exist with regard to medicines, as well as to other agents, and, where they are known, they may require to be attended to by the prescriber.

*Habit.*—This has an important influence on the operation of medicines. In general, it diminishes the effect resulting from the action of external powers on the system; hence medicines often lose part of their power by having been long continued, and the doses of them, therefore, require to be enlarged under their protracted use. This is particularly the case with all strong stimulants and narcotics, and is even observed, to a certain extent, in some of the other classes of the Materia Medica. In a few instances, the reverse has been supposed to hold true, particularly with regard to emetics and to the saline cathartics.

*Disease.*—This has an influence on the doses of medicines not less important; the susceptibility to external impressions, and to action, being much varied in morbid affections, and the operations of remedies of course being modified by such variations. The state of susceptibility being in general apparent, when it varies much from the healthy standard, the doses of the medicines administered are regulated accordingly, and this, it is obvious, admits of no general observations, as being entirely dependent on the nature and state of disease.

The following table shews the doses of the principal medicines, simple and compound, employed in modern practice, those stated being such as are adapted to the prime of life, and requiring, therefore, in particular cases, to be modified according to the influence of the preceding circumstances.

## TABLE OF THE DOSES OF MEDICINES.

Acetis ammoniae, uncia dimidia — drachma una.
......... hydrargyri, granum unum— grana duo.
......... potassae, drachma dimidia — drachma una.
Acetum scillae maritimae, drachma dimidia -- drachma una.
......... colchici, drachma una.
Acidum muriaticum, guttae viginti — triginta.
......... nitricum, drachma dimidia.
......... sulphuricum aromaticum, guttae viginti—triginta.
.......................... dilutum, guttae viginti.
Aconitum napellus, grana duo.
Æther nitrosus, drachma dimidia.
........ sulphuricus, drachma dimidia.
Æthiops mineralis, grana decem.
Alcohol ammoniatum aromaticum, guttae viginti—triginta.
......... . ...................... foetidum, drachma dimidia.
Allium sativum, drachma una.
Aloe perfoliata, grana decem.
Alumen, grana quinque—decem.
Ammoniaretum cupri, grana dimidium -- granum unum.
Amomum zingiber, grana decem — drachma dimidia.
Ammoniacum, grana decem — scrupulus.
Angustura, drachma dimidia.
Anthemis nobilis, drachma dimidia.
Antimonii tartris, granum unum -- grana tria.
............ oxidum cum phosphate calcis, grana quinque...decem.
............ sulphuretum praecipitatum, grana duo—grana quinque.
Aqua acetitis ammoniae, uncia dimidia -- uncia una.
..... ammoniae, guttae quindecim--- triginta.
...... calcis. libra in dies.
..... carbonatis ammoniae, drachma dimidia.
...... potassae, drachma dimidia.
...... super-carbonatis potassae, librae duo in dies.
Aqua super-carbonatis sodae, librae duo in dies.
Arbutus uva ursi, scrupulus--drachma dimidia.
Aristolochia serpentaria, drachma dimidia.
Arnica montana, grana duo--quinque.
Arsenica solutio, guttae quatuor ter in dies.
Artemisia santonica, scrupulus...drachma dimidia.
Assa foetida, grana decem---scrupulus. ʒβ
Atropa belladona, gran umunum.
Balsamum Copaiba, drachma dimidia. vel ʒj
............ Peruvianum, grana decem.
Belladona, granum unum.
Bubon galbanum, drachma dimidia.
Callicocca ipecacuanha, grana quindecim.
Cancrorum chelae, drachma una.
............... lapilli, drachma una.
Calomelas, grana una---decem. vel ʒj
Camphora, grana quinque—scrupulus.
Cantharis, granum unum.
Carbonas ammoniae, scrupulus — drachma dimidia.
............ calcis praeparatus, drachma una.
............ ferri praecipitatus, grana decem.
..................... praeparatus, grana decem—scrupulus.
............ magnesiae, drachma dimidia.
............ potassae, grana decem.
............ sodae, grana decem.
Cascarilla, drachma dimidia.
Castoreum, scrupulus—drachma dimidia.
Catechu, grana decem—scrupulus.
Cicuta, grana tria.
Cinchona Caribaca, drachma dimidia.
............ officinalis, drachma dimidia.
Colocynthis, grana duo—quinque.
Colomba, scrupulus.
Conium maculatum, grana tria.
Contrayerva, scrupulus.
Convolvulus jalapa, drachma dimidia.
............... scammonia, grana tria— quinque.
Cortex Peruvianus, drachma dimidia.

Cremor tartari, uncia dimidia—uncia una.
Creta praeparata, drachma una.
Cuprum ammoniacum, grana dimidia —granum unum.
Cusparia febrifuga, drachma dimidia,
Decoctum aloes, unciae duae.
............ cinchonae officinalis, unciae quater ter iu dies.
............ daphnes mezerei, libra in dies.
............ digitalis, uncia una.
............ geoffraeae inermis, unciae duae.
............ lignorum, libræ duæ in dies
............ sarsaparillae, librae duae iu dies.
Digitalis purpurea, granum unum.
Dolichos pruriens, grana quinque—decem.
Dorstenia contrayerva, drachma dimidia.
Elaterium, granum unum.
Electuarium cassiæ sennæ, uncia una.
............ catechu, drachma dimidia
............ lenitivum uucia una.
............ opiatum, drachma dimidia.
............ scammonii, drachma dimidia.
Elixir sacrum, drachmae sex.
Emulsio amygdalis communis, librae duae in dies.
.......... camphorata, unciae quater in dies.
Extractum anthemidis nobilis, grana decem—scrupulus.
............ aloes, grana quinque—decem.
............ cascarillae, scrupulus.
............ catharticum, grana quinque —decem.
............ chamaemeli, grana decem ...scrupulus.
............ cinchonae, grana decem.
............ colocynthidis compositum, grana quinque...decem.
............ convolvuli jalapae, grana decem.
............ corticis Peruviani, grana decem.
............ hellebori nigri, grana decem.
............ haematoxyli Campechensis, grana decem...scrupulus.
............ humuli, grana quinque...quindecim.
Extractum jalapae, grana decem.
............ opii, granum unum...duo.
............ rhei, grana decem...drachma dimidia.
Ferri limatura purificata, drachma una.
...... carbonas, grana decem...drachma dimidia.
...... sulphas, granum unum...grana duo.
...... tartaras, grana duo...decem.
Ferrum ammoniatum, grana quinque.
Galbanum, scrupulus...drachma dimidia.
Gambogia, grana quinque.
Guaiacum officinale, grana decem—scrupulus.
Hydrargyrus calcinatus, granum unum.
.............. cum creta, grana duo—decem.
.................... magnesia, grana duo —decem. ~~[illegible]~~
Hydrargyri acetas, grana duo.
............ sub-murias, granum unum —grana decem. vel 20
............ murias, granum dimidium in dies.
............ oxidum cinereum, granum unum—grana duo.
Hydro-sulphuretum ammoniae, guttae quinque—decem.
Hyosciamus niger, granum unum—grana duo.
Infusum amarum, unciae duae bis terve in dies.
.......... anthemidis, unciae tres bis in dies.
.......... columbae, unciae duae.
.......... caryophyllorum, uncia una.
.......... cascarillae, unciae duae.
.......... cuspariae, unciae duae.
.......... catechu, uncia tertia quaque hora.
.......... cinchonae officinalis, unciae duae.
.......... digitalis purpureae, uncia una bis in dies.
.......... gentianae luteae, unciae duae bis terve in dies.
.......... japonicum, uncia tertia quaque hora.
.......... lini, librae duae in dies.
.......... rhei palmati. unciae quater.
.......... sennae, unciae quater.
.......... tamarindi Indici cum senna, unciae sex.

Infusum quassiae, unciae duae.
.......... valerianae, unciae duae.
Ipecacuanha, grana quindecim.
Jalapa, drachma dimidia.
Kino, grana decem—scrupulus.
Lac ammoniaci, uncia una.
Lactuca virosa, grana duo.
Laudanum liquidum, guttae viginti quinque.
Liquor arsenicalis, guttae quater ter in dies.
......... antimonii tartarizati, uncia dimidia—uncia una.
......... ferri alkalini, guttae decem ter quaterve in dies.
......... hydrargyri oxymuriatis, drachma una—duo.
Lixivium causticum, guttae viginti bis in dies.
Magnesia, scrupulus unus.
Manna, uncia una.
Mel scillæ, drachma una--drachmæ duo.
Meloe vesicatorius, granum unum.
Mistura ammoniaci, uncia una bis terve in dies.
......... assafœtidæ, uncia una bis terve in dies.
......... ferri composita, uncia bis in dies.
......... hydrargyri corrosivus, granum dimidium in dies.
......... guaiaci, uncia bis in dies.
......... camphoræ, unciæ duæ.
......... cretæ, unciæ duæ bis in dies.
Moschus, grana decem--scrupulus.
Murias ammoniæ et ferri, grana quinque.
Myrrha, grana decem--scrupulus.
Nitrum, grana decem--scrupulus.
Oleum ricini, uncia una.
......... volatile anisi, guttæ quinque--decem.
................. carui, guttæ quinque
................. juniperi communis, guttæ quinque.
................. menthæ piperitæ, guttæ duæ--quinque.
Opium, granum unum
Oxidum antimonii cum phosphate calcis, grana quinque--decem.
......... hydrargyri cinereum, granum unum---grana duo.
......... zinci, grana duo--quinque
Oxymel scillæ, drachma una--drachmæ duæ.
Oxymurias potassæ, grana decem bis in dies.
Phosphas sodæ, uncia una.
Pilulæ aloes, grana decem.
.............. cum assafœtida, grana decem.
..................... colocynthide, grana quinque—decem.
.................... myrrha, grana decem.
......... ammoniareti cupri, pilula una mane et vespere.
......... assafœtidæ compositæ, grana decem.
......... galbani compositæ, grana decem
......... hydrargyri, pilula una ter in dies.
......... myrrhæ compositæ, grana decem.
......... opiatæ, grana quinque---decem.
......... rhei compositæ, grana decem.
......... scillæ, grana decem.
........ saponis cum opio, grana quinque.
......... e styrace, grana quinque.
......... cambogiæ, grana decem.
.. ...... ferri cum myrrha, grana quinque---decem.
......... hydrargyri sub-muriatis, pilula una mane et vespere.
Pulvis aloes compositus, grana decem---quindecim.
........ antimonialis, grana quinque--decem.
........ aromaticus, grana quinque---decem.
........ carbonatis calcis compositus, drachma una.
........ cretæ compositus, drachma dimidia.
................................ cum opio, scrupulus---drachma dimidia.
........ contrayervæ compositus, drachma dimidia.
........ cornu usti cum opio, grana decem.
........ doveri, grana decem...scrupulus.
........ ipecacuanhæ et opii, grana decem...scrupulus.
........ jalapæ compositus, drachma dimidia—drachma una.
........ opiatus, grana decem.
........ scammonii compositus, grana decem.

Rheum palmatum, scrupulus---drachma dimidia.
Rhus toxicodendron, granum unum.
Rubia tinctorum, drachma dimidia.
Rubigo ferri præparata, grana decem---triginta.
Sagapenum, grana decem---viginti.
Santonicum, drachma dimidia.
Scammonium, grana quinque...decem.
Scilla exsiccata, granum unum...grana duo.
Serpentaria virginiana, scrupulus ... drachma dimidia.
Sinapis alba, uncia dimidia,
Solutio muriatis barytae, guttae decem bis in dies.
......... muriatis calcis, guttae viginti.
Spiritus aetheris nitrosi, drachma dimidia.
......... aetheris vitriolici, drachma dimidia.
......... ammoniae, drachma dimidia.
......................... aromaticus, drachma dimidia.
......................... foetidus, drachma dimidia.
......................... anisi, uncia dimidia.
......... lavandulae composita, drachma dimidia...drachma una.
......... nitri dulcis, drachma dimidia.
Stannum, drachma dimidia ... drachmae duae.
Succus spissatus aconiti napelli, granum unum.
..................... atropae belladonae, granum unum.
..................... conii maculati, grana duo.
..................... hyoscyami nigri, granum unum...grana duo.
..................... lactucae virosae, grana quinque.
..................... momordicae elaterii, granum unum.
Sulphas cupri, granum unum ... grana duo.
......... ferri, granum unum...grana quinque.
......... magnesiae, uncia una ... unciae duae.
......... potassae, drachma una ... drachmae duae.
.........sodae, uncia una...unciae duae.
......... zinci, grana quinque...decem.
Sulphur, drachmae duae...uncia dimidia.
......... antimonii praecipitatum, grana quinque.
Sulphuretum antimonii praeparatum, grana decem...drachma dimidia.
............................ praecipitatum, grana quinque.
................. hydrargyri nigrum, grana decem.
................. potassae, grana decem ...viginti.
Super-sulphas aluminae et potassae, grana quinque...decem.
Super-tartris potassae, uncia dimidia ...uncia una.
Swietenia febrifuga, drachma dimidia.
............. mahagoni, drachma dimidia.
Syrupus colchici autumnalis, uncia dimidia.
......... opii, uncia una.
......... papaveris somniferi, uncia una.
......... rhamni cathartici, uncia una.
......... scillae maritimae, drachmae duae...uncia dimidia.
Tartarus emeticus, granum unum.
Tartarum solubile, uncia una.
Tartris antimonii, granum unum.
......... potassae, uncia una.
.................... et sodae, uncia una.
Tinctura aloes aetherea, drachma una mane et vespere.
........... aloes, drachmae duae.
........... angusturae, drachmae duae.
........... assae foetidae, drachma una.
........... camphorae composita, drachmae duae...uncia dimidia.
........... cantharidum, guttae quindecim.
........... castorei, drachma una.
........... castorei composita, drachma dimidia.
........... catechu, drachma una.
........... cinchonae, drachmae duae.
......................... composita, drachma una...drachmae duae.
.......... colombae, drachmae duae.
............ convolvuli jalapae, uncia dimidia.
............ digitalis purpureae, guttae decem...quindecim.
............ ferri acetatis, drachma dimidia.
............ ferri ammoniati, drachma dimidia.

Tinctura ferri muriati, guttae decem ...viginti

........... gentianae composita, drachmae duae.

........... guaiaci, drachmae duae.

........... guaiaci ammoniata, drachma

........... hellebori nigri, drachma una.

........... humuli, drachma dimidia... drachma una.

........... hyoscyami nigri, drachma dimidia.

........... jalapae, drachmae duae.

........... japonica, drachma una.

........... kino, drachma una.

........... meloes vesicatorii, guttae quindecim.

........... opii, guttae viginti quinque.

........... opii ammoniata, drachma dimidia...drachma una.

........... opii camphorata, drachmae duae...uncia dimidia.

........... quassiae, drachmae duae.

........... rhei palmati, uncia dimidia ...uncia una.

........... rhei et aloes, uncia dimidia ...uncia una.

........... rhei composita, uncia una.

Tinctura scillae, drachma dimidia.

........... sennae, uncia una.

........... valerianae ammoniata, drachma dimidia.

........... veratri albi, guttae quinque.

Trochisci glycyrrhizae cum opio, drachma in dies.

Uva ursa, scrupulus...drachma dimidia.

Valeriana officinalis, scrupulus unus ...drachma una.

Vinum aloes socotorinae, uncia una.

......... antimoniale, drachmae duae... sex.

......... antimonii tartarisati, drachmae duae....uncia dimidia.

......... gentianae compositum, uncia dimidia.

......... ipecacuanha, uncia dimidia... uncia una.

......... nicotianae tabaci, guttae viginti bis in dies.

......... rhei palmati, uncia una.

Zinci oxidum, grana duo...quinque.

...... sulphas, grana quinque...decem.

Zingiber, grana decem...scrupulus unus.

The following Tables are given by the Colleges to shew the proportions of Opium, and of certain preparations of Antimony, Quicksilver, Arsenic, and Iron, in compound medicines containing them, according to their respective Pharmacopœias. The first is the Table referring to the Edinburgh,—the second, that referring to the London,—and the third, that referring to the Dublin Pharmacopœia.

## TABLE I.

Vinum tartritis antimonii in singulis unciis habet Tartritis Antimonii, olim Tartari emetici, grana duo.

Tinctura Opii, olim Laudanum Liquidum, fit cum Opii scrupulis duobus in singulis unciis liquidi, sive cum granis quinque in singulis drachmis. Tincturae autem drachma, ut liquoris evaporatione constat, continet Opii grana circiter tria cum semisse.

Tinctura opii ammoniata, olim elixir paregoricum, fit cum Opii granis circiter octo in singulis unciis liquidi; sive cum grano fere uno in singulis drachmis.

Tinctura saponis et opii, olim linimentum opiatum, et balsamum anodynum, fit cum Opii scrupulo uno in singulis unciis liquidi

Pulvis ipecacuanhæ et opii, olim pulvis doveri, in singulis drachmis habet Opii grana sex, sive in granis decem, Opii granum unum.

Electuarium mimosæ catechu, olim confectio japonica, in singulis unciis habet Opii grana circiter duo cum semisse: In granis enim centum et nonaginta tribus, habet Opii granum unum.

Electuarium opiatum, olim thebaicum, in singulis drachmis habet Opii granum fere unum cum semisse.

Pilulæ hydrargyri, in singulis drachmis habent Hydrargyri grana quindecim. Singulae pilulae habent Hydrargyri granum unum.

Pilulæ opiatæ, olim thebaicæ, in singulis drachmis habent Opii grana sex. Pilula granorum quinque, habet Opii granum dimidium.

Trochisci glycyrrhizæ cum opio, in singulis drachmis habent Opii granum fere unum.

Unguentum nitratis hydrargyri fortius, in singulis drachmis habet Hydrargyri grana quatuor, Acidi Nitrosi grana octo.

Unguentum nitratis hydrargyri mitius, in singulis scrupulis habet Hydrargyri granum dimidium, Acidi Nitrosi granum unum.

Unguentum hydrargyri, in singulis drachmis habet Hydrargyri grana duodecim; cum duplice Hydrargyro, drachma habet grana viginti quatuor.

Emplastrum hydrargyri, in singulis drachmis habet Hydrarygri grana circiter sexdecim.

## TABLE II.

Confectio opii a in granis circiter sex et triginta continet Opii granum.

Liquor antimonii tartarizati in fluiduncia continet Antimonii tartarizati grana duo.

Liquor arsenicalis in fluiduncia continet Oxydi Arsenici grana quatuor.

Liquor hydrargyri oxymuriatis in fluiduncia continet Hydrargyri Oxymuriatis granum dimidium.

Pilulae hydrargyri in granis tribus continent Hydrargyri granum.

Pilulae hydrargyri Submuriatis in granis circiter quinque continent Hydrargyri Submuriatis granum.

Pilulae saponis cum opio in granis quinque continent Opii granum.

Pulvis cornu usti cum opio in granis decem continet Opii granum.

Pulvis cretae compositi cum opio in scrupulis duobus continet Opii granum.

Pulvis ipecacuanhae compositus in granis decem continet Opii granum.

Pulvis kino compositus in scrupulo continet Opii granum.

Unguentum hydrargyri fortius in drachmis duabus continet Hydrargyri drachmam.

Unguentum hydrargyri mitius in drachmis sex continet Hydrargyri drachmam.

## TABLE III.

Pulvis ipecacuanhæ compositus in granis decem continet Opii granum unum.

Syrupus opii, in *mensura* unciali, continet extracti opii aquosi granum circiter; liquor enim, ex adjecto saccharo, crescit in molem plus quam duplicem.

Tinctura opii in *mensura* drachmae continet opii purificati grana quatuor cum semisse circiter.

Tinctura opii camphorata in *mensura* drachmarum quatuor cum semisse continet opii purificati granum unum quamproxime.

Electuarium catechu compositum in singulis unciis continet opii purificati grana duo cum semisse circiter.

Pilulæ hydrargyri in granis sex continent hydrargyri grana duo.

Pilulæ e styrace, in granis quinque massae continent opii purificati granum unum.

Hydrargyri cum magnesia grana tria continent hydrargyri grana duo.

Unguentum hydrargyri fortius, in drachmis duabus continet hydrargyri drachmam unam.

Tinctura acetatis ferri cum alcohol in *mensura* drachmae continet acetatis ferri siccati granum circiter.

# TABLES *of* CHANGED NAMES *in the New Edinburgh and London Pharmacopoeias.*

In drawing up these Tables, it has not been thought necessary to insert the names of the Simple Medicines, as both the proper names of the articles, according to the nomenclature of natural history, and their common or trivial names, are inserted in the index to the work; and thus the old or the new name of any simple substance may be easily found. In these Tables, therefore, the names of the Compound Medicines only are inserted, and the catalogue of them has been extended so far as to include not only the synonimes inserted in the present editions of the London and Edinburgh Pharmacopœias, but a number of older names, once generally established, and still occasionally used.

## TABLE I.

| *Old Names.* | *Names in the Ed. Ph.* | *Names in the Lond. Ph.* |
|---|---|---|
| Acetum distillatum | Acidum acetosum distillatum | Acidum aceticum |
| Acidum vitriolicum | ——— sulphuricum | ——— sulphuricum |
| Ærugo æris | Sub-acetis cupri | Sub-acetas cupri impura |
| Æthiops mineralis | Sulphuretum hydrargyri nigrum | |
| Æther vitriolicus | Æther sulphuricus | Æther sulphuricus |
| Alkali fixum fossile | Soda | Soda |
| ——— vegetabile | Potassa | Potassa |
| ——— volatile | Ammonia | Ammonia |
| Alumen | Sulphas aluminæ | Super-sulphas aluminæ et potassae |
| Ammonia præparata | Carbonas ammoniæ | Ammoniæ carbonas |
| Antimonium | Sulphuretum antimonii | Antimonii sulphuretum |
| ——— præparatum | ——— præparatum | |
| Antimonium calcareo-phosphoratum | Oxidum antimonii cum phosphate calcis | Pulvis antimonialis |
| ——— muriatum | Murias antimonii | |
| ——— tartarisatum | Tartris antimonii | Antimonium tartarizatum |
| ——— vitrificatum | Oxidum antimonii cum sulphure vitrificatum | |
| Aqua ammoniæ acetatæ | Aqua acetitis ammoniæ | Liquor acetatis ammoniæ |
| ——— causticæ | ——— ammoniæ | ——— ammoniæ |
| ——— cupri vitriolati composita | Solutio sulphatis cupri composita | |
| ——— fortis | Acidum nitrosum dilutum | Acidum nitrosum dilutum |
| ——— lixivia caustica | Aqua potassæ | Liquor potassæ |
| ——— lithargyri acetati | | ——— plumbi acetatis |
| ——— composita | | ——— dilutus |
| ——— sappharina | | ——— cupri ammoniati |
| ——— styptica | Solutio sulphatis cupri comp. vitrificatum | |

| *Old Names.* | *Names in the Ed. Ph.* | *Names in the Lond. Ph.* |
|---|---|---|
| Argentum nitratum | Nitras argenti | Argenti nitras |
| Balsamum canadense | Resina liquida pini balsameæ | Terebinthina canadensis |
| ———— anodynum | Tinctura saponis cum opio | |
| ———— saponaceum | -------- saponis | Linimentum saponis compositum |
| ———— sulphuris | Oleum sulphuratum | Oleum sulphuratum |
| ———— traumaticum | Tinctura benzoes comp. | Tinctura benzoini comp. |
| Butyrum antimonii | Murias antimonii | |
| Calaminaris lapis | Carbonas zinci impurus | Calamina |
| Calomelas | Sub-murias hydrargyri | Hydrargyri sub-murias |
| Calx hydrargyri alba | | Hydrargyrus præcipitatus albus |
| Causticum commune acerrimum | Potassa | Potassa fusa |
| ———————— mitius | Potassa cum calce | Potassa cum calce |
| Cancrorum lapilli | Carbonas calcis durior | |
| Causticum lunare | Nitras argenti | Argenti nitras |
| Cerussa | Oxidum plumbi album | Plumbi carbonas |
| Cerussa acetata | Acetis plumbi | ------- super-acetas |
| Cinnabaris factitia | Sulphuretum hydrargyri rubrum | Hydrargyri sulphuretum rubrum |
| Confectio cardiaca | Electuarium aromaticum | Confectio aromatica |
| ——— japonica | ------------ catechu | |
| Crocus antimonii, vel crocus metallorum | Oxidum antimonii cum sulphure per nitratem potassæ | |
| Creta præparata | Carbonas calcis mollior | |
| Cuprum ammoniacum | Ammoniaretum cupri | Cuprum ammoniatum |
| ——— vitriolatum | Sulphas cupri | Cupri sulphas |
| Crystalli tartari | Super-tartris potassæ | Potassæ super-tartras |
| Decoctum album | | Mistura cornu usti |
| ---------- chamæmeli, vel commune | Decoctum anthemidis nobilis | |
| ——— lignorum | --------- guaiaci comp. | |
| ——— pro enemate | | ——— malvæ comp. |
| ------------- fomento | | ——— papaveris |
| Elaterium | Succus spissatus momordicæ elaterii | |
| Electuarium lenitivum | Electuarium cassiæ sennæ | Confectio sennæ |
| ---------- thebaicum | ------------ opiatum | ——— opii |
| Elixir paregoricum | Tinctura opii ammoniata | Camphoræ composita |
| ----- proprietatis | -------- aloes cum myrrha | Tinctura aloes composita |
| ---------------- vitriolicum | -------- aloes ætherea | |
| ----- sacrum | -------- rhei et aloes | |
| Elixir salutis | Tinct. cassiæ sennæ comp. | Tinctura sennæ |
| ——— stomachicum | ——— gentianæ comp. | ——— gentianæ comp. |

| *Old Names.* | *Names in the Ed. Ph.* | *Names in the Lond. Ph.* |
|---|---|---|
| Elixir vitrioli acidum | Acidum sulphuricum aromaticum | |
| Emplastrum adhæsivum | Emplastrum resinosum | Emplastrum resinæ |
| ——— attrahens | ——— simplex | ——— ceræ |
| ——— cantharidum | ——— meloes vesicatorii | ——— lyttæ |
| ——— cereum | ——— simplex | ——— ceræ |
| ——— commune | ——— oxidi plumbi semivitrei | ——— plumbi |
| ——— lithargyri | ——— oxidi plumbi semivitrei | ——— plumbi semivitrei |
| ——— roborans | ——— ferri rubri | |
| ——— vesicatorium | ——— meloes vesicatorii | ——— cantharidis |
| Emulsio communis | Emulsio amygdalæ communis | Mistura amygdalæ |
| Extractum catharticum | | Extractum colocynthidis compositum |
| Ferri rubigo | Carbonas ferri præparatus | |
| —— squamæ | Ferri oxidum nigrum | |
| Ferrum ammoniatum | Murias ammoniæ et ferri | Ferrum ammoniatum |
| ——— vitriolatum | Sulphas ferri | Ferri sulphas |
| ——— ustum | Oxidum ferri rubrum | |
| Flores benzoini | Acidum benzoicum | Acidum benzoicum |
| —— martiales | Murias ammoniæ et ferri | Ferrum ammoniatum |
| —— sulphuris | Sulphur sublimatum | Sulphur sublimatum |
| —— zinci | Oxidum zinci | Zinci oxidum |
| Hepar sulphuris | Sulphuretum potassæ | Potassæ sulphuretum |
| Hiera picra | | Pulvis aloes cum canella |
| Hydrargyrus acetatus | Acetis hydrargyri | |
| ——— calcinatus | | Hydrargyri oxydum rubrum |
| ——— muriatus corrosivus | Murias hydrargyri | ——— oxymurias |
| ——— mitis | Sub-murias hydrargyri | ——— sub-murias |
| ——— præcipitatus | ——— præcipitatus | |
| ——— nitratus ruber | Oxidum hydrargyri per acidum nitricum | ——— nitrico-oxydum |
| ——— præcipitatus cinereus | Oxidum hydrargyri cinereum | ——— oxydum cinereum |
| ——— sulphuratus niger | Sulphuretum hydrargyri nigrum | |
| ——— sulphuratus ruber | | ——— sulphuretum rubrum |
| ——— vitriolatus flavus | Sub - sulphas hydrargyri flavus | |
| Infusum amarum | Infusum gentianæ comp. | Infusum gentianæ comp. |
| ——— rosarum | ——— rosæ gallicæ | ——— rosæ |
| Julepum e camphora | | Mistura camphoræ |

| *Old Names.* | *Names in the Ed. Ph.* | *Names in the Lond. Ph.* |
|---|---|---|
| Kali | Potassa | Potassa |
| Lac sulphuris | | Sulphur præcipitatum |
| —— amygdalæ | Emulsio amygdalæ | Mistura amygdalæ |
| —— ammoniaci | | ———— ammoniaci |
| —— assafœtidæ | | Mistura assafœtidæ |
| —— guaiaci | | Mistura guaiaci |
| Laudanum liquidum | Tinctura opii | Tinctura opii |
| Linimentum anodynum | Tinctura saponis cum opio | |
| ———— aquæ calcis | Oleum lini cum calce | |
| ———— opiatum | Tinctura saponis cum opio | |
| ———— saponaceum | ———— saponis | Linimentum saponis compositum |
| ———— volatile | Oleum ammoniatum | ———— ammoniæ subcarbonatis |
| Lithargyrus | Oxidum plumbi semivit. | Plumbi oxydum semivit. |
| Lixiva | Potassa | Potassa |
| Lixivium causticum | Aqua potassæ | Liquor potassæ |
| ———— tartari | | ———— sub-carbonatis |
| Magnesia alba | Carbonas magnesiæ | Magnesiæ carbonas |
| ———— usta | Magnesia | Magnesia |
| ———— vitriolata | Sulphas magnesiæ | Magnesiæ sulphas |
| Mel Ægyptiacum | | Linimentum æruginis |
| —— rosaceum | | Mel rosæ |
| —— acetatum | | Oxymel |
| Mercurius | Hydrargyrus | Hydrargyrus |
| ———— calcinatus | | Hydrargyri oxyd. rubrum |
| ———— corrosivus sublimatus | Murias hydrargyri | ———— oxymurias |
| ———— ruber<br>———— præcipitatus ruber | Oxidum hydrargyri rubrum per acidum nitricum | ———— nitrico-oxyd. |
| ———— dulcis sublimatus | Sub-murias hydrargyri | ———— sub-murias |
| ———— emeticus flavus | Sub-sulphas hydrargyri | |
| ———— præcipitatus albus | | Hydrargyrus præcipitatus albus |
| Minium | Oxidum plumbi rubrum | |
| Natron | Soda | Soda |
| Nitrum | Nitras potassæ | Potassæ nitras |
| Oleum terebinthinæ | Oleum volatile pini | Oleum terebinthinæ |
| Oxymel æruginis | | Linimentum æruginis |
| Philonium Londinense | | Confectio opii |
| Pilulæ cupri | Pilulæ ammoniareti cupri | |
| ———— gummosæ | | Pilulæ galbani composita |
| ———— rufi | ———— aloes cum myrrha | ———— aloes cum myrrha |
| ———— thebaicæ | ———— opiatæ | ———— saponis cum opio |
| Potio cretacea | Potio carbonatis calcis | Mistura cretæ |
| Pulvis antimonialis | Oxidum antimonii cum phosphate calcis | Pulvis antimonialis |

| *Old Names.* | *Names in the Ed. Ph.* | *Names in the Lond. Ph.* |
|---|---|---|
| Pulvis e bolo compositus cum opio | | Pulvis cretæ compositus cum opio |
| —— cretaceus | Pulvis carbonatis calcis compositus | —— cretæ compositus |
| —— doveri | —— ipecacuanhæ et opii | —— ipecacuanhæ compositus |
| Pulvis sternutatorius | Pulvis asari compositus | |
| —— stypticus | —— sulphatis aluminae compositus | |
| Resina alba | | Resina pini |
| Rubigo ferri praeparata | Carbonas ferri praeparatus | |
| Saccharum saturni | Acetis plumbi | Plumbi super-acetas |
| Sal absinthii | Carbonas potassae | Potassae sub-carbonas |
| —— alkalinus fixus fossilis | —— sodae | Sodae sub-carbonas |
| —— alkalinus fixus vegetabilis | —— potassae | Potassae sub-carbonas |
| —— ammoniacus | Murias ammoniae | Ammoniae murias |
| —— —— volatilis | Carbonas ammoniae | —— carbonas |
| —— catharticus amarus | Sulphas magnesiae | Magnesiae sulphas |
| —— —— glauberi | —— sodae | Sodae sulphas |
| —— cornu cervi | Carbonas ammoniae | Ammoniae carbonas |
| —— diureticus | Acetis potassae | Potassae acetas |
| —— glauberi | Sulphas sodae | Sodae sulphas |
| —— marinus | Murias sodae | —— murias |
| —— martis | Sulphas ferri | Ferri sulphas |
| —— polychrestus | Sulphas potassae cum sulphure | |
| —— rupellensis | Tartris potassae et sodae | Soda tartarizata |
| —— tartari | Carbonas potassae | Potassae sub-carbonas |
| Saturni extractum | | Liquor plumbi acetatis |
| Soda purificata | —— sodae | Sodae sub-carbonas |
| —— muriata | Murias sodae | —— murias |
| —— phosphorata | Phosphas sodae | |
| —— tartarisata | Tartris potassae et sodae | Soda tartarizata |
| —— vitriolata | Sulphas sodae | Sodae sulphas |
| Spiritus aetheris vitriolici | Æther sulphuricus cum alcohole | Spiritus ætheris sulphurici |
| —— ammoniae | Alcohol ammoniatum | —— ammoniae |
| —— aromaticus | —— —— aromaticum | —— —— aromaticus |
| —— fœtidus | —— —— foetidum | —— —— foetidus |
| —— camphoratus | Tinctura camphorae | —— camphorae |
| —— cornu cervi | Aqua carbonatis ammoniae | Liquor ammoniae carbonatis |
| —— mindereri | —— acetitis ammoniae | —— —— acetatis |
| —— nitri dulcis | Spiritus aetheris nitrosi | Spiritus aetheris nitrici |
| —— —— glauberi | Acidum nitrosum | |
| —— salis ammoniaci | Aqua ammoniae | Liquor ammoniae |

| *Old Names.* | *Names in the Ed. Ph.* | *Names in the Lond. Ph.* |
|---|---|---|
| Spiritus salis marini glauberi | Acidum muriaticum | Acidum muriaticum |
| ——— vinosus camphoratus | Tinctura camphorae | Spiritus camphorae |
| ——— ——— rectificatus | Alcohol | ——— rectificatus |
| ——— ——— tenuior | ——— dilutum | ——— tenuior |
| ——— vitrioli dulcis | Æther sulphuricus cum alcohole | ——— aetheris sulphurici |
| ——— volatilis aromaticus | Alcohol ammoniatum aromaticum | ——— ammoniae aromaticus |
| ——— ——— foetidus | ——————— foetidum | ——— ——— foetidus |
| Succi ad scorbuticos | Succus cochleariae compositus | |
| Sulphur antimonii praecipitatum<br>——— auratum antimonii | Sulphuretum antimonii praecipitatum | Antimonii sulphuretum praecipitatum |
| Sulphuris flores | Sulphur sublimatum | Sulphur sublimatum |
| Syrupus balsamicus | Syrupus toluiferae balsami | Syrupus tolutanus |
| ——— e meconio | ——— papaveris somniferi | ——— papaveris |
| Tartarus crudus | Super-tartris potassae impurus | |
| Tartari crystalli | ——————— potassae | Potassae super-tartras |
| Tartarus emeticus | Tartris antimonii | Antimonium tartarizatum |
| Tartarum solubile | ——— potassae | Potassae tartras |
| ——— vitriolatum | Sulphas potassae | ——— sulphas |
| Tinctura aloes vitriolata | Tinctura aloes aetherea | |
| ——— amara | ——— gentianae composita | Tinctura gentianae composita |
| ——— aromatica | ——— cinnamomi composita | ——— cinnamomi composita |
| ——— cantharidum | ——— meloes vesicatorii | ——— lyttae |
| ——— ferri | ——— muriatis ferri | ——— ferri muriatis |
| ——— foetida | ——— ferulae assaefoetidae | ——— assaefoetidae |
| ——— guaiacina volatilis | ——— guaiaci ammoniata | ——— guaiaci ammoniata |
| ——— japonica | ——— mimosae catechu | ——— catechu |
| ——— martis | ——— muriatis ferri | ——— ferri muriatis |
| ——— melampodii | ——— hellebori nigri | ——— hellebori nigri |
| ——— opii camphorata | | ——— camphorae composita |
| ——— rhei amari | ——— rhei et gentiana | |
| ——— rosarum | Infusum rosarum | Infusum rosae |
| ——— sacra | Vinum aloes socotorinae | Vinum aloes |
| ——— thebaica | Tinctura opii | Tinctura opii |
| ——— tolutana | ——— toluiferae balsami | |
| ——— valerianae volatilis | | ——— valerianae ammoniata |
| Trochisci arabici | Trochisci gummosi | |

| *Old Names.* | *Names in the Ed. Ph.* | *Names in the Lond. Ph.* |
|---|---|---|
| Turpethum minerale | Sub-sulphas hydrargyri flavus | |
| Tutia | Oxidum zinci impurum | |
| Unguentum album | Unguentum oxidi plumbi albi | |
| ——— basilicum flavum | ——— resinosum | Ceratum resinae flavae |
| ——— coeruleum | ——— hydrargyri | Unguentum hydrargyri |
| ——— citrinum | ——— nitratis hydrargyri | ——— nitratis |
| ——— epispasticum fortius | ——— pulveris meloes vesicatorii | Ceratum lyttae |
| ——— mitius | ——— infusi meloes vesicatorii | |
| ——— saturninum | ——— acetitis plumbi | Ceratum plumbi superacetatis |
| Vinum amarum | Vinum gentianae compositum | |
| ——— antimoniale | ——— tartritis antimonii | Liquor antimonii tartarizati |
| ——— chalybeatum | | Vinum ferri |
| Vitriolum album | Sulphas zinci | Zinci sulphas |
| Vitriolum cœruleum | Sulphas cupri | Cupri sulphas |
| ——— viride | ——— ferri | Ferri sulphas |
| Vitrum antimonii | Oxidum antimonii cum sulphure vitrificatum | |
| Zincum ustum | Oxidum zinci | Zinci oxidum |
| ——— vitriolatum | Sulphas zinci | ——— sulphas |

## TABLE II.

| *Names in the Ed. Ph.* | *Names in the Lond. Ph.* | *Old Names.* |
|---|---|---|
| Acetis plumbi | Plumbi super-acetas | Saccharum saturni |
| —— potassae | Potassae acetas | Sal diureticus<br>Lixiva acetata |
| Acidum benzoicum | Acidum benzoicum | Flores benzoini |
| —— nitrosum dilut. | Acidum nitricum dilut. | Aqua fortis |
| —— sulphuricum | —— sulphuricum | Acidum vitriolicum |
| —— —— aromaticum | | Acidum vitrioli aromat.<br>Elixir vitrioli acidum |
| Æther sulphuricus | Æther sulphuricus | Æther vitriolicus |
| Alcohol | Alcohol | Spiritus vinosus rectificatus |
| —— ammoniatum | Spiritus ammoniae | Spiritus ammoniae |
| —— —— aromaticum | —— —— aromaticus | —— —— aromaticus |
| —— —— foetidum | —— —— foetidus | —— —— foetidus |
| Ammonia | Ammonia | Alkali volatile |
| Ammoniaretum cupri | Cuprum ammoniatum | Cuprum ammoniacum |
| Aqua acetitis ammoniae | Liquor ammoniae acetatis | Spiritus mindereri |
| —— ammoniae | | Aqua ammoniae causticae |
| —— carbonatis ammoniæ | —— ammoniae carbonatis | Spiritus cornu cervi<br>Aqua ammoniae |
| —— potassae | —— potassae | —— lixivia caustica<br>Lixivium causticum |
| Carbonas ammoniae | Ammoniae carbonas | Sal ammoniacus volatilis<br>—— cornu cervi |
| —— calcis | Creta praeparata | Creta alba<br>Lapilli cancrorum |
| —— ferri praeparatus | | Rubigo ferri praeparata |
| —— magnesiae | Magnesiae carbonas | Magnesia alba |
| —— potassae | Potassae sub-carbonas | Sal alkalinus fixus vegetabilis<br>—— tartari |
| —— sodae | Sodae sub-carbonas | Sal alkalinus fixus fossilis<br>Soda purificata |
| —— zinci impurus | Calamina praeparata | Lapis calaminaris |
| Decoctum guaiaci comp. | | Decoctum lignorum |
| Electuarium aromaticum | Confectio aromatica | Confectio cardiaca |
| —— cassiæ sennæ | —— sennae | Electuarium lenitivum |
| —— catechu | | Confectio japonica |
| —— opiatum | —— opii | Electuarium thebaicum |
| Emplastrum meloes vesicatorii | Emplastrum lyttae | Emplastrum vesicatorium |
| —— oxidi ferri rubri | | —— roborans |

| *Names in the Ed. Ph.* | *Names in the Lond. Ph.* | *Old Names.* |
|---|---|---|
| Emplastrum plumbi semivitrei | Emplastrum plumbi | Emplastrum commune |
| ——— resinosum | ——— resinae | ——— adhaesivum |
| ——— simple | ——— cerae | ——— cereum |
| Emulsio amygdalae communis | Mistura amygdalae | Emulsio communis |
| Murias ammoniae | Ammoniae murias | Sal ammoniacus |
| ——— et ferri | Ferrum ammoniatum | Flores martiales |
| ——— antimonii | | Butyrum antimonii |
| ——— hydrargyri | Hydrargyri oxymurias | Hydrargyrus muriatus corrosivus |
| ——— sodae | Sodae murias | Sal marinus |
| Nitras argenti | Argenti nitras | Causticum lunare |
| ——— potassae | Potassae nitras | Nitrum |
| Oleum ammoniatum | Linimentum ammoniae | Linimentum volatile |
| ——— lini cum calce | | ——— aquae calcis |
| ——— sulphuratum | Oleum sulphuratum | Balsamum sulphuris |
| Oxidum antimonii cum phosphate calcis | Pulvis antimonialis | Antimonium calcareo-phosphoratum |
| Oxidum antimonii cum sulphure per nitratem potassae | | Crocus antimonii, vel crocus metallorum |
| Oxidum antimonii cum sulphure vitrificatum | | Vitrum antimonii |
| Oxidum ferri nigrum | | Ferri squamæ |
| ——— rubrum | | Ferrum vitriolatum ustum |
| ——— hydrargyri per acidum nitricum | Hydrargyri nitrico-oxydum | Hydrargyrus nitratus ruber |
| ——— hydrargyri cinereum | ——— oxidum cinereum | ——— præcipitatus cinereus |
| ——— plumbi album | Plumbi sub-carbonas | Cerussa |
| ——— rubrum | | Minium |
| ——— semivitreum | ——— oxydum semivitreum | Lithargyrus |
| ——— zinci | Zinci oxydum | Flores zinci |
| ——— impurum | | Tutia |
| Phosphas sodæ | | Soda phosphorata |
| Pini abietis resina | Pix arida | Pix Burgundica |
| ——— balsameæ resina | Terebinthina canadensis | Balsamum canadense |
| ——— laricis oleum | Oleum terebinthinæ | Oleum terebinthinæ |
| Potassa | Potassa | Alkali fixum vegetabile<br>Causticum commune acerrimum |
| ——— cum calce | Potassa cum calce | Causticum commune mitius |
| Potio carbonatis calcis | Mistura cretæ | Potio cretacea |
| Pulvis carbonatis calcis compositus | Pulvis cretæ compositus | Pulvis cretaceus |
| Soda | Soda | Alkali fixum fossile |

| *Names in the Ed. Ph.* | *Names in the Lond. Ph.* | *Old Names.* |
|---|---|---|
| Solutio sulphatis cupri composita | | Aqua styptica |
| Spiritus ætheris nitrosi | Spiritus ætheris nitrici | Spiritus nitri dulcis |
| Sub-acetas cupri | Ærugo | Ærugo æris |
| Sub-murias hydrargyri | Hydrargyri sub-murias | Calomelas<br>Hydrargyrus muriatus mitis |
| Sub-sulphas hydrargyri | | Turpethum minerale |
| Sulphas aluminæ | Alumen | Alumen |
| ——— cupri | Cupri sulphas | Vitriolum cœruleum |
| ——— ferri | Ferri sulphas | Sal martis<br>Vitriolum viride |
| ——— magnesiæ | Magnesiæ sulphas | Sal catharticus amarus |
| ——— potassæ | Potassæ sulphas | Tartarum vitriolatum |
| ——— potassæ cum sulphure | | Sal polychrestus |
| ——— sodæ | Sodæ sulphas | --- glauberi |
| ——— zinci | Zinci sulphas | Vitriolum album |
| Sulphur sublimatum | Sulphur sublimatum | Flores sulphuris |
| Sulphuretum antimonii | Antimonii sulphuretum | Antimonium |
| ——— antimonii præcipitatum | ——— sulphuretum præcipitatum | Sulphur antimonii præcipitatum<br>------- auratum antimonii |
| ——— hydrargyri nigrum | | Æthiops mineralis |
| ——— ——— rubrum | Hydrargyri sulphuretum rubrum | Cinnabaris factitia |
| ——— potassæ | Potassæ sulphuretum | Hepar sulphuris |
| Syrupus toluiferæ balsami | Syrupus tolutanus | Syrupus balsamicus |
| Super-tartris potassæ | Potassæ super-tartras | Tartari crystalli |
| Tartris antimonii | Antimonium tartarisatum | Tartarus emeticus |
| ——— potassæ | Potassæ tartras | Tartarum solubile |
| ——— potassæ et sodæ | Soda tartarizata | Sal rupellensis |
| Tinctura benzoes composita | Tinctura benzoini composita | Balsamum traumaticum |
| ——— camphoræ | Spiritus camphoræ | Spiritus vinosus camphoratus |
| ——— muriatis ferri | ——— ferri muriatis | Tinctura martis |
| ——— opii ammoniata | ——— camphoræ composita | Elixir paregoricum |
| ——— saponis | Linimentum saponis | Linimentum saponaceum |
| ——— saponis cum opio | | ——— opiatum<br>——— anodynum |
| Unguentum nitratis hydrargyri | Unguentum hydrargyri nitratis | Unguentum citrinum |
| ——— acetitis plumbi | Ceratum plumbi super-acetatis | ——— saturninum |
| ——— pulveris meloes vesicatorii | ——— lyttæ | ——— epispasticum fortius |
| ——— resinosum | ——— resinæ | ——— basilicum |

# ENGLISH INDEX.

A

Page
Acetic acid i. 60, ii. 162
Acetate of ammonia 397, 241
 of lead 285, 345
 of potash 372, 215
 of quicksilver 208, 309
 of zinc ii. 353
Acetous acid i. 449
 distilled ii. 160
 strong 162
Acids i. 25
Aconite 159
Acrid principle 63
Albumen vegetable 45
Alkohol i. 65, 127, ii. 144
Alkalis i. 19
Alkanet 291
Almond 491
 emulsion ii. 28
Aloes i. 347, 362
Althæa i. 486
Alum 473, 276
 dried ii. 243
Amber, oil and salt of i. 181, ii. 182
Ammonia i. 23, 319, 455, 234
Ammoniuret of copper 289
Ammoniated alkohol 237
 oil i. 439, 156
Ammoniac i. 415
Analysis, chemical 5
 vegetable 33
Angelica 265
Angustura 247
Animal oil 180
Anise 264
Antacids 453
Anthelmintics 497
Antimonial powder i. 313, ii. 269
 wine 317, 287
Antimony i. 307, 400, 412
 prepared ii. 267
 preparations of i. 311, ii. 267

Page
Antispasmodics i. 175
Arabic emulsion ii. 29
Argil i. 17
Aroma 62
Aromatic ammoniated alkohol i. 356, ii. 239
 electuary } ii. 369
 confection }
 powder 359
 sulphuric acid 189
 tincture 96
Arrow-root powder i. 489
Arsenic 219, 476
 oxide prepared ii. 356
 solution 356
Arseniate of potash i, 222, ii. 357
Asarabacca i. 324, 430
Assafœtida i. 183, 361
Astringents i. 267

B

Balsam i. 53
Balsam of Canada 386
 of Capaiva 385
 of Gilead 420
 of Peru 417
 of Tolu 418
Barbadoes tar 182
Bark, Peruvian 255
Barytes 18, 228
Benzoic acid i. 60. ii. 165
Benzoin i. 419
Bismuth 227
Bistort 291
Bitter apple 346
 principle 63
Blessed thistle 258
Bole, Armenian 275
Boracic acid 29
Borax 452
Broom 384
Bryony 345
Buckthorn 347

Page
Burgundy pitch i. 438
    plaster ii. 416

C

Cabbage tree bark i, 504
Cajeput oil 186
Calamine prepared ii. 349
    cerate 401
Calcination i. 86
Calomel i. 206, ii. 316
Camphor i. 50, 136, 402
    mixture ii. 32
Camphorated acetous acid 86
Camphorated emulsion 30
    liniment 94
    oil 157
    spirit 94
Canella i. 256
Cantharides 389, 435
Capsicum 259
Caraway 265
Carbon 11
Carbonate of ammonia i. 398, ii. 231
    of iron precipitated ii. 294
    of lime i. 278, 456
        prepared ii. 246
    of magnesia 252
    of potash 206, ii. 209
    of soda 223, ii. 225
Carbonic acid i. 28; 470, ii. 448
Carburetted hydrogen gas ii. 447
Cardamom, smaller i. 262
Cascarilla 247
Cassia bark 256
    buds 256
    purging 336
Castor 180, 361
    oil 338
Cathartics 325
Cataplasms ii. 417
Catechu i. 294
Caustic, common i. 474, ii. 213
    lunar 472, ii. 265
Centaury i. 252
Cerusse 288
Chalk, prepared ii. 247
    potion or mixture 248
Chamomile i. 250, 323
Cherry tree laurel 173
Cinnabar ii. 343
Cinnamon i. 255
    water ii. 158
Citric acid i. 446, ii. 59
Citrate of ammonia i. 397

Page
Cloves i. 258
Colocynth 346
Colomba 249
Confections ii. 369
Conserves 16
Contrayerva i. 247
Copaiba balsam 385
Copper 216, 280, 318
    preparations of ii. 289
Coriander i. 264
Cowhage 502
Crabs claws, prepared } 78, 456
    stones } ii. 246
Cream of Tartar i. 353, 373, 451
Crocus of antimony ii. 276
Crystallization i. 89
Cubebs 261
Cucurbit 88
Cumin 265
    plaster ii. 415

D

Decoction i. 68
Decoctions ii. 49
Decomposition i. 75, 80
Deflagration 86
Demulcents 481
Dephlegmation 88
Diaphoretics 391
Digestion 85
Dill-seed 265
Diluents 479
Distillation 69, 87
Distilled waters ii. 134
    spirits 140
Diuretic salt i. 372, ii 215
Diuretics i. 366
Dover's powder i. 402, ii. 362
Dragons blood i. 397

E

Earths 160
Elaterium i. 346, ii. 25
Elder rob ii. 24
    ointment 404
Electricity 454
Elemi i. 431
Electuaries ii. 368
Elm i. 384
Elutriation 82
Emetics 299
Emmenagogues 358
Emollients 495
Emulsions ii. 23

Page
Escharotics i. 472
Epispastics 432
Epsom salt 552
Errhines 427
Ethers 65
Ether, sulphuric i. 155, ii. 190
  nitric ii. 200
Ethereal oil 199
Ethiops mineral 537
Euphorbium i. 431, 438
Evaporation 86
Expectorants 407
Exsiccation 67
Extracts ii. 119
Extraction i. 85
Extractive matter 53

F
Fecula i. 43
Fennel, sweet 265
Fern, male 503
Fluoric acid 29
Foxglove 162, 378, 413
Fusion 85

G
Galbanum i. 184
Gallic acid 57
Galls 290
Galvanism ii. 456
Gamboge i. 350, 504
Garlic i. 414
Gentian 251
Ginger 262
Glaubers salt i. 352, ii. 229
Gluten i. 44
Goulard's extract 284
Granulation 82
Guaiac 403
Gum 41
Gum ammoniac 415
  arabic 484
  plaster ii. 411
  resins i. 53
  tragacanth 48

H
Hartshorn i. 490
  burnt ii. 10
  oil of i. 18
  salt of 18
  spirit of ii. 25
Hedge hyssop i. 28
Hellebore, black 344, 36

Page
Hellebore, white 430
Hemlock 160
Henbane, black 156
Hepatized ammonia 319
Honeys, medicated ii. 76
Hop i. 172
Horehound 253
Horse chesnut 429
  radish 425
Hydrogen gas i. 10, ii. 446
Hydro-sulphuret of ammonia i. 319
  ii. 242
Hyper-oxygenated muriate of potash i. 232, ii. 180
Hyssop i. 266

I
Indian pink i. 503
Infusion 68, 85
Infusions ii. 35
Ipecacuan i. 320
Iron 269, 278, 361
  preparations of ii. 292
Isinglass i. 491

J
Jalap i. 343
Juices ii. 18
  inspissated 20
Juniper i. 385

K
Kali ii. 214
Kermes, mineral 273
Kino i. 295

L
Laurel berry, oil of i.
Laudanum ii. 106
Lavender i. 429
Lead 280
  acetate of i. 284 ii. 345
Lemon i. 254, 470
Lenitive electuary ii. 370
Leopard's-bane i. 170
Lettuce, strong-scented i. 169, 383
Levigation 82
Ley 85
  caustic ii. 211
Ligneous fibre i. 62
Lime i. 17, 229, 277, 468
  water ii. 2
Liniment of ammonia 149
Liniments 356
Lintseed i. 486
Liquorice i. 487, ii. 122
Litharge i. 283
  plaster ii. 409

Page
Lithontriptics i. 459
Liverwort 490
Lixiviation 85
Logwood 292
M
Mace 257
Maceration 85
Madder 364
Magnesia 17, 340, 468
calcined ii. 253
Mahogany i. 249
Malic acid 58
Manna 335
Marjoram 429
Marsh mallow 486
Mastich 298
Measures 91
Mercury 194, 423
Mercurial ointment ii. 393
pills 379
Metallic preparations i. 14, ii. 255
Mezereon 405, 426
Minium i. 289
Monks-hood 159
Mixtures ii. 30
Mucilage i. 41
Mucilages ii. 48
Muriate of ammonia i. 399
and iron ii. 301
of antimony 277
of barytes 244
of magnesia i. 356
of quicksilver 203, ii. 311
of soda i. 356
Muriatic acid 27, 451, 470, ii. 169
Musk i. 179
Mustard 325, 363, 456
cataplasm ii. 417
Myrrh i. 416
N
Narcotic principle i. 64
Narcotics 116
Nightshade, deadly 158
woody 383
Nitrate of potash 374, 451
silver ii. 265
Nitre i. 374, 451
Nitric acid 27, 230, ii. 183
Nitrogen i. 8
Nitrous acid ii. 181
gas 453
diluted 186
oxide gas 444
Nutmeg i. 257

O
Page
Oak bark i. 289
Oil, expressed 47, ii. 26
volatile i, 48, ii. 146
Ointments 388
Olive oil i. 492, 500
Opium 140, 401
Orange 253, 448,
Orris 428
Oxalic acid 59
Oxide of antimony with phosphate
of lime 313. ii. 269
of antimony with sulphur
by nitrate of potash i. 311, ii. 276
of antimony with sulphur
vitrified 312, 267
of arsenic 220, 356
of quicksilver ii. 327, 339
Oxygen gas i. 7, ii. 442
Oxymels 77
Oxymuriatic acid ii. 176, 452
Oxymuriate of potash i. 232, ii. 176
P
Palm oil i. 496
Paregoric elixir ii. 107, 113
Pellitory i. 424
Peppermint 265
Pennyroyal 266
Pepper, black 260
Guinea 259
Jamaica 261
long 260
Peruvian balsam 417
bark 235
Phosphate of soda 355, ii. 227
Phosphorus i. 13
Pills ii. 375
Pimento i. 261
Pink, Indian 503
Pitch 388
Plasters ii. 408
Poison oak i. 171
Poppy, white i. 139, 156
Potash i. 21, 372, 454, 474, 465,
ii. 213
Potassium i. 21
Powders ii. 358
Precipitation i. 88
Proof spirit 131
Prussic acid 61
Pulverization 82
Q
Quassia i. 250

Page
Quicksilver ·i. 194, 423, ii. 508
  calcined 339
  purified 308
  with chalk 337
   magnesia 338
  white precipitate 341
  muriate of i. 206, 476
   ii. 311
  sub-muriate of i. 206,
   ii. 316, 525
  sub-nitrate i. 202, 476,
   ii. 332
  sulphurets of 337, 343
  acetate of 309
  grey oxide of 327, 531
  red oxide of 339
  yellow sub-sulphate 335

R

Rectification i. 88
Refrigerants 440
Resin 51
  white and yellow 388
Rhododendron 171
Rhubarb i. 341, 563
Rochelle salt 555, ii. 226
Rose, red i. 292
Rosemary 429
Rubefacients 432
Rue 364

S

Sacred Elixir ii. 109
  tincture 80
Saffron, English i. 186
  meadow 383
Sagapenum 184
Sage 406
Sago 488
Sal-ammoniac 599
  polychrest ii. 218
Salop i. 489
Salt of amber i. 181, ii. 182
  of hartshorn 182, 232
  of tartar 206
Sarsaparilla i. 487
Sassafras 406
Saunders, red 298
Savine 564, 477
Scammony 349
Sea oak, or wrack ii. 12
Seneka i. 415
Senna 341
Shells prepared ii. 12
Sialogogues i. 421
Silex i. 16

Page
Siver, nitrate of i. 194, 474. ii. 265
Simarouba i. 250
Sinapism ii. 417
Snake-root, Virginian i. 246
Soap 467
  liniment ii. 109
Soda i. 22, 455, 466
  carbonate of ii. 223, 225
Sodium i. 23
Soluble tartar 554, ii. 219
Solution i. 83
  of acetite of zinc ii. 553
   muriate of barytes 246
   muriate of lime 251
   sulphate of zinc 553
   copper, compound 291
Sorrel i. 449
Spearmint 266
Spermaceti 493
Spirit of ammonia ii. 237
   aromatic 239
   foetid ib.
  lavender 145
  minderus i. 241
  of nitrous ether 576, ii. 203
  sulphuric ether 198
Spirit, ardent i. 127 144
Spirits, distilled 140
Sponge, burnt 11
Squill i. 522, 577, 413,
  dried ii. 5
Starch i. 489
Storax 419
  purified ii. 8
Strontites i. 18
Sub-acetite of copper 218
Sub-carbonate of potash ii. 206
Sub-carbonate of soda, ii. 223
Sub-muriate of mercury i. 206, 311
Sub-sulphate of mercury 335
Sublimation i. 88
Sugar 46
Sugar of lead i. 285, ii. 545
Sulphate
  of copper i. 217
   iron i. 212, ·ii. 296
   magnesia i. 351
   potash 353, ii. 217
   soda 552, 229
   zinc 216, 552
Sulphur i. 12, 559
  precipitated ii. 13
  sublimed, washed 13
Sulphurated oil 157

Page
Sulphuret of antimony prepared i. 310, ii. 267
precipitated i. 514, ii. 272
potash ii 220
quicksilver i. 209, ii. 337, 344
Sulphuric acid i. 26, 275
aromatic ii. 189
diluted 187
ether i. 134, ii. 190
Super-carbonate of potash i. 454, 466 ii. 210
soda i. 455, 466, ii. 225
Super-sulphate of argil and potash i. 276, 473
Super-tartrate of potash i. 353, 373, 451
Syrups ii. 64
T
Tamarind i. 337, 448
Tannin 56
Tansy 505
Tar 388
mineral 182
water ii. 35
Tartar i. 353, 373
Tartar, emetic i. 515, ii. 282
Tartaric acid i. 59
Tartrate of antimony i. 315, ii. 282
potash & soda i. 355, ii. 226
of potash i. 354, ii. 219
Thorn-apple 169
Tin 355, 500
Tinctures 88
Tobacco i. 167, 324, 357, 382, 413, 426
Tolu balsam i. 418
Tonics 188
Tormentil 291
Trefoil 253
Trituration 82
Troches ii. 385
Turpeth mineral 335
Turpentine i. 357, 387
Cyprus 389
Page
Turpentine oil of i. 387. 500, ii. 154
Tutty, prepared i. 216, ii. 350
V
Valerian, wild i. 185
Vegetable analysis 33
Verdigris 218, 475
Vinegar 449
distilled ii. 160
Vinegars, medicated 85
Vitriol, blue i. 217, 475
green i. 212. ii. 296
white i. 216, ii. 352
Volatile liniment i. 439, ii. 156
oils ii. 146
Vomica nut i. 172
W
Wake robin 425
Water, distilled ii. 136
sea 432
of acetite of ammonia 241
ammonia 234
carbonate of ammonia 232
potash 211
sulphuret of potash 222
super-carbonate of potash 210
of soda 225
Waters, mineral 420
Wax i. 51
Weights 90
Whortleberry 293
Wine 133
Wines, medicated ii. 79
Wolfsbane 159
Wood, sorrel 449
Wormseed 502
Wormwood 252
Z
Zedoary 261
Zinc i. 215, 279, 318
oxide of ii. 350
carbonate of 349
sulphate of 352
acetate of 358

# LATIN INDEX.

A

Page
Absinthium vulgare i. 252
Acetis ammoniae i. 397, ii. 241
hydrargyri 208, 309
plumbi 284, 545
potassae 372, 215
zinci 353
Acetum i. 449
aromaticum ii. 85
distillatum 160
scillae maritimae 86
colchici 87
Acidum acetosum camphoratum 86
distillatum 160
forte 162
benzoicum 165
carbonicum i. 470, ii. 448
citricum i. 466, 470, ii. 167
aceticum ii. 162
muriaticum i. 470, 451, ii. 169
nitricum i. 230, ii. 185
nitrosum ii. 181, 453
dilutum 186
oxy-muriaticum 176, 452
succini i. 181, ii. 182
sulphuricum i. 273
aromaticum ii. 189
dilutum 187
vitriolicum i. 273
Aconitum napellus 159
Acorus calamus 255
Ærugo 218, 475
Æsculus hippocastanum 429
Æther nitrosus ii. 200
sulphuricus i. 134, ii. 190
cum alkohole 198
alkohole aromaticus 198
Æthiops mineralis 337
Alcohol i. 127, ii. 144
ammoniatum 237
aromaticum 239

Page
Alcohol ammoniatum foetidum ii. 239
Allium sativum i. 414, 438
Aloe perfoliata 347, 362
Althaea officinalis 486
Alumen i. 276, 473
ustum ii. 243
Ammonia i. 25, 319
Ammoniaretum cupri ii. 289
Amomum repens i. 262
zingiber 262, 426
zedoaria 261
Ammoniacum 415
Amygdalus communis 491
Amylum 489
Amyris Gileadensis 420
Anchusa tinctoria 291
Anethum graveolens 265
foeniculum ib.
Angelica archangelica ib.
Angustura 247
Anisum 264
Anthemis nobilis 251, 323
pyrethrum 424
Antimonium i. 307, 400, 412, ii. 267
Antimonii oxidum ii. 267-9
murias 277
tartris i. 315, ii. 282
sulphuretum praecipitatum i. 314, ii. 273
Aqua acetitis ammoniae 397, 241
ammoniae 319, 234
anethi 139
carui 139
calcis 249
composita 251
carbonatis ammoniae 232
cinnamomi i. 138
citri aurantii 137
medicae 138
cupri ammoniati 290
distillata 136

Page
Aqua foeniculi i. 139
    kali ii. 218
    lauri cassiae 138
    menthae piperitae ib.
        pimentae 139
        pulegii 138
    picis ii. 35
    potassae 211
    rosae centifoliae 139
    stillatitiae 135
    sub-carbonatis kali ii. 209
    super-carbonatis potassae i. 454, 466, ii. 210
        sodae i. ibid. ii. 225
    sulphureti kali ii. 222
        ammoniae 243
Arbutus uva ursi i. 293
Argentum 193
    vivum 194
Aristolochia serpentaria i. 246
Arnica montana 170
Arsenias kali ii. 357
Arsenicum i. 219, 476
Arsenici oxidum praeparatum ii. 356
    solutio ib.
Artemisia absinthium i. 242
    santonica 502
Arum maculatum 425
Assa foetida 183, 361
Asarum Europaeum 324, 430
Astragalus tragacantha 485
Atropa belladona 158
Aurantium Hispalense 253, 448
Axungia porcina 496
B
Balsamum Canadense i. 386
    Copaiba 385
    Gileadense 420
    Peruvianum 417
    Tolutanum 418
Barytes 228
Belladona 158
Benzoinum 419
Bismuthum 227
Bistorta 291
Bitumen petroleum 182
Bolus armena 275
Borax 452
Bryonia alba 345
Bubon galbanum 184
C
Callicocca ipecacuanha i. 320
Cancrorum chelae } i. 278, ii. 246
    lapilli }
Page
Calx i. 229, 277, 450, 468
Calomelas i. 206, ii. 316
Calamina praeparata 349
Calomba 249
Camphora i. 136
Canella alba 256
Cantharis 389, 434
Capsicum annuum 259
Carbonas ammoniae i. 398, ii. 231
    calcis i. 278, 450
        preparatus ii. 244
    ferri praecipitatus 294
        praeparatus 293
    magnesiae i. 252
    potassae 206, 209
        purissimus 208
    sodae 223, 225
    zinci praeparatus ii. 349
Cardamomum minus i. 262
Carum carui 263
Caryophyllus aromaticus 258
Cascarilla 247
Cassia 256
    fistula 336
    senna 341
Castoreum 180, 361
Cataplasma fermenti ii. 417
    sinapeos 417
Catechu i. 294
Causticum commune i. 474, ii. 218
    lunare i. 474, ii. 265
Centaurea benedicta i. 253
Cera 493
Ceratum calaminae ii. 401
    carbonatis zinci impuri 401
    cetacei 390
    lyttae 391
    plumbi 400
    resinae 390
    saponis 405
    simplex 389
    sabinae 406
Cerussa i. 283
Chamaemelum 251
Chelae cancrorum praeparatae ii. 247
Chironia centaurium i. 253
Cicuta 160
Cinchona Caribaea 245
    floribunda 246
    officinalis 235
Cinnabaris factitia ii. 343
Cinnamomum i. 255
Citras ammoniae 397
Citrus aurantium 253, 448

Page
Citrus medica 254, 446
Cocos butyracea 496
Cochlearia armoracia 425
Colchicum autumnale 383
Colocynthis 345
Colomba 249
Confectio aromatica ii. 369
  japonica 372
  opiata 372
  amygdalae 373
  rutae 374
  sennae 371
  scammoniae 374
Conium maculatum i. 160
Conserva ii. 16
  citri aurantii 16
  rosae gallicae 17
  caninae 17
Contrayerva i. 247
Convolvulus jalapa 343
  scammonia 349
Copaifera officinalis 385
Coriandrum sativum 264
Cornu cervi 490
  ustum ii. 10
Cortex Peruvianus i. 235
Cremor tartari 353, 373, 451
Crocus antimonii ii. 267
  sativus i. 186
Croton eleutheria 247
Creta praeparata ii. 247
Crystalli tartari i. 353, 373, 451
Cubeba 261
Cucumis colocynthis 345
Cuminum cyminum 265
Cuprum 217, 280, 318
  ammoniatum ii. 289
Cusparia febrifuga i. 247
Cycas circinalis ii. 488
D
Daphne mezereum i. 405, 426
Datura stramonium 169
Decoctum althaeae officinalis ii. 52
  aloes 59
  anthemidis nobilis 53
  chamaemeli ib.
  cinchonae officinalis ib.
  commune ib.
  cornu cervini 32
  cydoniae 60
  daphnes mezerei 54
  dulcamarae 60
  digitalis 63
  geoffraeae inermis 55
Page
Decoctum guaiaci compositum ii. 56
  hordei distichi ib.
  lichenis 60
  lignorum 56
  malvae 61
  papaveris ib.
  polygalae senegae 57
  quercus 61
  sarsaparillae 58, 62
  ulmi 62
  veratri 63
Digitalis purpurea i. 162, 378, 413
Dolichos pruriens 502
Dorstenia contrayerva 247
Dulcamara 383
E
Elaterium i. 346, ii. 25
Electuarium aromaticum 369
  cassiae fistulae 370
    sennae ib.
  catechu 372
  lenitivum ii. 370
  opiatum 372
  scammonii 374
  thebaicum 372
Elemi i. 439
Elixir paregoricum 107, 113
  sacrum 109
Emplastrum adhaesivum 409
  ammoniaci 414
  ammoniaci cum hydrargyro 415
  aromaticum 416
  assafœtidae 410
  calefaciens 416
  cantharidis 413
  cerae 408
  commune 409
  cumini 415
  gummosum 411
  galbani ib.
  hydrargyri ib.
  lithargyri 409
  lyttae 413
  meloes vesicatorii 412
    compositum 414
  opii 415
  oxidi ferri rubri 410
  plumbi semivitrei 409
  picis 416
  resinosum 409
  roborans 410
  saponaceum 412
  simplex 408

Page

- Emplastrum thuris 410
  - vesicatorium 414
- Emulsio amygdalis communis 29
  - arabica ib.
  - camphorata 30
- Emulsiones ii. 28
- Enema catharticum 53
- Enema foetidum 55
- Eugenia caryophyllata i. 258
- Euphorbium 431, 458
- Extracta ii. 119
- Extractum anthemidis nobilis 121
  - aloes 123
  - absinthii 129
  - cascarillae 133
  - cassiae sennae 122
  - catharticum 125
  - chamaemeli 1 1
  - cinchonae 124
  - colocynthidis compositum 125
  - convolvuli jalapii 130, 132
  - corticis Peruvian 124
    - cum resina 131
  - genistae 129
  - gentianae luteae 121
  - glycyrrhizae 122
  - hellebori nigri 123
  - haematoxyli Campechensis 122
  - humuli 126
  - jalapae 130, 132
  - opii 126
  - papaveris somniferi 125
  - quercus 130
  - rhei 127
  - rutae graveolentis 123
  - sabinae 130
  - sarsaparillae 128
  - taraxaci ib
  - valeriani 129

F

- Ferri limatura purificata ii. 292
  - oxidum 292, 298
  - carbonas 293-4
  - sulphas 296
  - murias 298
  - tartarum 303
  - acetas 305
- Ferrum i. 209, 278, 361
  - ammoniatum 301
  - tartarisatum 302
- Ferula assafœtida i. 183
- Filix mas 505
- Fraxinus ornus 335

Page

G

- Galbanum i. 184
- Gallae 290
- Gambogia 350, 504
- Gas acidum carbonicum ii. 448
  - muriaticum 451
  - nitrosum 453
  - oxymuriaticum 452
  - hydrogenium 446
    - carbonatum 447
  - oxydum nitrosum 444
  - nitrogenium 447
  - oxygenium 442
- Genista i. 384
- Gentiana lutea 251
- Geoffraea inermis 504
- Glycyrrhiza glabra 487
- Gratiola officinalis 384
- Guaicum officinale 403
- Gummi Arabicum i. 484
  - astragali tragacanthae 485
  - mimosae niloticae ib.

H

- Haematoxylon Campechianum i. 292
- Helleborus albus 430
  - niger 344, 363
- Hepar sulphuris ii. 220
- Heracleum gummiferum i. 415
- Humulus lupulus 172
- Hydrargyrus 194, 422, 499
  - calcinatus ii. 339
  - cum creta i. 201, ii. 337
    - magnesia 338
  - muriatus corrosivus i. 204, ii. 311
    - mitis i. 206, ii. 314
  - praecipitatus ruber i. 202, ii. 332
    - albus i. 208, ii. 341
  - purificatus 308
  - sulphuratus niger i. 209, ii. 337
    - ruber i. 209, ii. 343
- Hydrargyri acetas i. 208, ii. 309
  - murias i. 204, 476 ii. 311
  - sub-murias i. 206, 350, ii. 316
  - sub-murias ammoniatum i. 208, ii. 341
  - sub-nitras i, 202, 276, ii. 332
  - oxymurias i. 203, ii. 312
  - oxidum cinereum i. 203. ii. 327
    - rubrum i. 202, ii. 339
  - sub-murias praecipitatus ii. 323

Page

- Hydrargyri oxidum per acidum nitricum i. 202, ii. 276
  - sub-sulphas flavus i. 203, ii. 335
  - sulphuretum rubrum i. 209, ii, 343
    - nigrum i. 209, 337
- Hydro-sulphuretum ammoniae i. 319, ii 242
- Hyosciamus niger i. 156
- Hyssopus officinalis 266

I

- Ichthyocolla i. 491
- Infusa ii. 35
- Infusum amarum 38
  - anthemidis 42
  - aurantii 43
  - columbae ib.
  - caryophyllorum ib.
  - cascarillae 44
  - cuspariae ib.
  - catechu 39
  - cinchonae officinalis 37
  - digitalis purpureae 38
  - gentianae luteae ib.
  - japonicum 39
  - lini 44
  - rhei palmati 40
  - rosae Gallicae 41
  - sennae 41, 45
  - tamarindi Indici cum senna 41
  - menthae compos. ii, 46
  - quassiae 45
  - simaroubae 46
  - tabaci ib.
  - valerianae 47
- Ipecacuanha i. 320
- Iris Florentina 428

J

- Jalapa i. 343
- Juniperus communis 385
  - sabina 364, 478

K

- Kali ii. 214
  - e tartaro ii. 208
- Kermes mineral i. 314, ii. 275
- Kino 295

L

- Lac ammoniaci ii, 31
  - amygdalae 29
  - assaefoetidae 31
- Lactuca virosa i. 169, 383

Page

- Laudanum liquidum ii. 106
- Lauro-cerasus i. 173
- Laurus camphora 138
  - cassia 256
  - cinnamomum 255
  - sassafras 406
- Lavandula spica 429
- Lichen Islandicus 429
- Limonum 254, 446, 470
- Linimentum ammoniae ii. 156
  - anodynum 110
  - camphorae compositum 94
  - calcis 389
  - hydrargyri 407
  - saponis 110
  - simplex 389
  - volatile 156
  - terebinthinae 407
- Linum ustitatissimum i. 486
- Lithargyrum 283
- Liquor plumbi acetatis ii. 347
  - arsenicalis 356
  - aluminis 244
  - antimonii tartarizati i. 317, ii. 288
  - cupri ammoniati 290
  - ferri alkalini 306
  - hydrargyri oxymuriatis 316
  - potassae ii. 212
  - potassae subcarbonatis ii. 209
- Lixivium causticum 211
- Liquor volatilis cornu cervini ii. 233
- Lytta vesicatoria i. 389, 434

M

- Macis i. 257
- Magnesia i. 340, 468, ii. 253
- Majorana i. 429
- Malva sylvestris 487
- Manna i. 335
- Maranta arundinacea 489
- Marrubium vulgare 253
- Mastiche 298
- Mel boracis 77
  - colchici 78
  - despumatum 77
  - rosae ib.
  - scillae 78
- Melaleuca cajeputa i. 186
- Melampodium 345
- Meloe vesicatorius 389, 434
- Mentha piperita 265
  - pulegium 266
  - sativa 266

Page

Mentha viridis i. 266
Menyanthes trifoliata 253
Mercurius 194, 422
Mezereum 405
Mimosa catechu 294
    nilotica 484
Minium 283
Misturae ii. 30
Mistura ammoniaci 31
    assafoetidae ib.
    cornu usti 32
    ferri composita 33
    guaiaci 34
    camphorae 32
    cretae 34
    moschi ib.
Momordica elaterium i. 346
Moschus 179
Mucilago amyli ii. 47
    gummi Arabici 48
        tragacanthae ib.
Murias ammoniae i. 399
    ammoniae et ferri ii. 301
    antimonii i. 475, ii. 277
    barytae 244
    hydrargyri i. 204, 476, ii. 311
    magnesiae i. 356
    sodae 374, 451
Myristica moschata 257
Myroxolon peruiferum 417
Myrrha 416
Myrtus pimenta 261

N

Nicotiana tabacum i. 167, 324, 357, 382, 413
Nitras argenti i. 474, ii. 265
    potassae 374, 451
Nitrum 374, 451
Nux moschata 257
    vomica 172

O

Olea Europaea i. 492. 500, ii. 27
    distillata vel volatilia i. 55, ii. 146
    fixa sive expressa i. 54, ii. 26
Oleum animale i. 180
    ammoniatum 156
    amygdalae communis 27
    cajeputae i. 186
    camphoratum ii. 157
    cornu cervi 155
    aethereum 199
    lini cum calce 389
        usitatissimi 27
    olivarum i. 492, 500 ii. 27

Page

Oleum palmae i. 496
    pini i. 387, 500, ii. 154
    ricini i. 338, ii. 27
    succini i. 181, ii. 152
    sulphuratum ii. 157
    terebinthinae i. 387, 500
        rectificatum ii. 154
    volatile anisi 151
    carui ib.
        juniperi communis 149
            sabinae 150
        lauri sassafras ib.
        lavandulae spicae ib.
        foeniculi 152
        melaleucae leucadendri i. 186
        menthae piperitae ii. 150
            viridis 151
        myrti pimentae 150
        origani 151
        pimpinellae anisi ib.
        pulegii ib.
        rorismarini ib.
        rutae 152
        sabinae 150
        sassafras ib.
Opium i. 140, 401
    purificatum ii. 133
Opobalsamum i. 420
Origanum majorana 429
Orchis mascula 489
Oxalis acetosella 449
Oxidum antimonii ii. 278
    antimonii album i. 312
    antimonii cum phosphate calcis i. 313, ii. 269
    antimonii cum sulphure per nitratem potassae i. 311, ii. 276
    antimonii cum sulphure vitrificatum i. 312, ii. 267
    antimonii vitrificatum cum cera 268
    arsenici i. 220, 276
    ferri purificatum ii. 292
        rubrum 298
    hydrargyri cinereum i. 208 ii. 327
    hydrargyri rubrum per acidum nitricum i. 202, ii. 332
    plumbi semivitreum i. 283
    zinci ii. 350
        impurum praeparatum 349

Page
Oxymel ii. 78
colchici ib.
scillæ ib.
aeruginis 79
Oxymurias potassae i. 232, ii. 176
P
Papaver somniferum i. 139
Petroleum Barbadense 182
Phosphas sodae i. 355, ii. 227
Pilulae aloes 376
cum assafoetida 377
colocynthide ib.
myrrha 378
zingibere 376
ammoniareti cupri 378
assafoetidae compositae 379
cambogiae 384
ferri cum myrrha ib.
galbani compositae ib.
hydrargyri sub-muriatis ib.
hydrargyri i. 201, ii. 379
myrrhae compositae 377
opiatae 381
Plummeri 384
rhei compositae 382
scillae 383
thebaicae 381
saponis cum opio ib.
e styrace 382
Pimento i. 261
Pimpinella anisum 264
Pinus abies 438
balsamea 380
larix 387
Piper cubeba 261
Indicum 259
longum 260
nigrum ib.
Pistacia lentiscus 298
terebinthinum 389
Pix arida ib.
Burgundica 438
liquida 388
Plumbum 280
Plumbi acetas i. 284, ii. 345
Polygala senega i. 415
Polygonum bistorta 291
Polypodium filix mas i. 303
Potassa i. 21, 372, 454, 465, 474
ii. 213
cum calce i. 474 ii. 214
Prunus lauro-cerasus i. 178
Pterocarpus draco 297
santalinus 298

Page
Pulegium i. 266
Pulvis aloes cum canella ii. 365
guaiaco 365
antimonialis i. 313, ii. 269
aromaticus 359
asari compositus 360
carbonatis calcis compositus 360
cretae compositus 361
cum opio 361
contrayerva compositus 366
cornu usti cum opio 363
doveri i. 402, ii. 362
ipecacuanhae et opii i. 402
ii. 362
jalapae compositus 361
kino compositus 366
opiatus 363
scammonii compositus ib.
sennae compositus 366
stypticus 364
sulphatis aluminae compositus ib.
tragacanthae compositus 367
Pyrethrum i. 424
Q
Quassia excelsa i. 250
simarouba ib.
Quercus robor 289
cerris 290
marinus ii. 12
R
Raphanus rusticanus i. 425
Resina alba et flava 388
Rhamnus catharticus 347
Rheum palmatum 341, 363
Rhododendron crysanthum 171
Rhus toxicodendron ib.
Ricinus communis 338
Rob sambuci ii. 24
Rosa gallica i. 292
Rosmarinus officinalis 429
Rubia tinctorum 364
Rubigo ferri praeparata ii. 293
Ruta graveolens i. 364
S
Sabina i. 364, 478
Saccharum saturni i. 285, ii. 345
Sagapenum i. 184
Sago 488
Sal ammoniacus 399
cornu cervi i. 182 ii. 231
diureticus 372 215
glauberi 352 229

Page

Sal marinus i. 356
  martis i. 212, ii. 296
  polychrestus 218
  rupellensis i. 555, ii. 226
  sodae i. 466, ii 223
  succini 182
  tartari 208
Salop i. 489
Salvia officinalis 406
Sanguis draconis 297
Santonicum 502
Sapo albus 46
Sarsaparilla 487
Sassafras 406
Scammonium 349
Scilla maritima i. 322, 377, 413
  exsiccata ii. 5
Seneka i. 415
Senna 341
Serpentaria Virginiana 246
Sevum ceti 493
Simarouba 250
Sinapis alba i. 228, 363, 437
Smilax sarsaparilla 487
Soda 22, 455, 466
Solanum dulcamara 383
Solutio acetitis zinci ii. 353
  muriatis barytae 246
  muriatis calcis 251
  sulphatis cupri composita 291
  sulphatis zinci 353
Spartium scoparium i. 584
Spermaceti 493
Spigelia Marilandica 505
Spiritus aetheris nitrosi i. 376, ii. 203
  aetheris vitriolici 198
  ammoniae 237
    aromaticus 239
    foetidus ib.
    succinatus 240
  anisi 142
  armoraciae compositus ib.
  camphoratus 94
  cari carui 141
  cinnamomi ib.
  juniperi compositus 142
  lavandulae spicae 143
    composita ib.
  menthae 142
  mindereri i. 397 ii. 241
  myristicae moschatae ii. 141
  myrti pimentae ib.
  nitri dulcis i. 376 ii. 203
  pimentae 141

Page

Spiritus pulegii ii. 142
  rorismarini officinalis 144
  vinosus rectificatus ib.
  vinosus camphoratus 94
Spongia usta 11
Stalagmitis cambogioides i. 350
Stannum i. 500 ii. 355
Stanni pulvis ii. 355
Stramonium i. 169
Strychnos nux vomica 172
Styrax benzoin 419
  officinale 419, ii. 8
Sub-acetis cupri i. 218, 475
Sub-boras sodae 452
Sub-carbonas sodae ii. 223
Sub-carbonas potassae 206
Succi 18
Succi spissati 20
Succinum i. 181
Succus cochleariae compositus ii. 19
Succus spissatus aconiti napelli 22
  atropae belladonae 23
  conii maculati ib.
  hyoscyami nigri ib.
  lactucae virosae 24
  momordicae elaterii ib.
  sambuci nigri ib.
Sulphas aluminae i. 276
  aluminae exsiccatus ii. 243
  cupri i. 217, 475
  ferri i. 212, ii. 296
    exsiccatus 297
  magnesiae i. 351
  potassae i. 353, ii. 217
  potassae cum sulphure 218
  sodae i. 352, ii. 229
  zinci i. 216, 279, 518, ii. 352
Sulphur i. 339
  praecipitatum ii. 13
  sublimatum lotum ib.
Sulphuretum antimonii praeparatum i. 310 ii. 267
  praecipitatum i. 314, ii. 273
  hydrargyri nigrum ii. 337
    rubrum 343
  potassae 220
Super-sulphas potassae ii. 219
Super-sulphas aluminae et potassae i. 276, 475

Page
Super-tartris potassae i. 553, 573, 451
Swietenia febrifuga 248
  mahagoni 249
Syrupus acidi acetosi ii. 65
  allii 75
  althaeae officinalis 65
  amomi zingiberis 66
  citri aurantii 67
  citri medici ib.
  colchici autumnalis 68
  communis 65
  croci 73
  dianthi caryophylli 68
  mori 74
  opii 75
  papaveris somniferi 69
  rhamni cathartici 70
  rhoeados 74
  rosae gallicae 71
    centifoliae ib.
  scillae maritimae 72
  sennae 75
  simplex 65
  limonis succi 67
  toluiferi balsami 72
  violatae odoratae 72
  zingiberis 66

T

Tamarindus Indica i. 537, 448
Tanacetum vulgare 503
Tartari crystalli 354, 375, 451
Tartarus emeticus i. 315, ii. 282
Tartarum solubile 219
  vitriolatum 217
Tartris antimonii i. 315, ii. 282
  potassae i. 354, ii. 219
    et sodae i. 355, ii. 226
Terebinthina Veneta i. 357, 387
Testae praeparatae ii. 12
Tinctura aloes aetherea 91
  aloes socotorinae 93
    cum myrrha 91
  aloes composita 92
  amomi repentis 92
  angusturae 117
  aristolochia serpentariae 92
  aromatica 96
  assafoetida 99
  aurantii 112
  balsami Tolutani 111
  benzoin composita 95
  camphorae 94
  camphorae composita 112

Page
Tinctura cantharidum ii. 104
  cardamomi composita 115
  capsici ib.
  cascarillae 114
  castorei 95
  castorei composita 95
  catechu 105
  cinchonae composita 114
    officinalis 96
  cinnamomi 104
    composita 96
  colombae 97
  convolvuli jalapae 97
  croci 98
  digitalis purpureae 97
  ferri acetatis 305
    ammoniati 302
    muriati 298
  galbani 118
  gallarum ib.
  gentianae composita 100
  guaiaci 101
  guaiaci ammoniata ib.
  hellebori nigri 102
  humuli 115
  hyoscyami nigri 102
  jalapae 98
  japonica 105
  kino 103
  lauri cinnamomi ib.
  meloes vesicatorii 104
  mimosae catechu 105
  moschi 118
  myrrhae 105
  opii 106
  opii ammoniata 107
  opii camphorata 113
  quassiae 118
  rhei palmati 108
  rhei et aloes 109
  rhei et gentianae ib.
  rhei composita 115
  sacra 80
  saponis 109
  saponis cum opio 110
  scillae 116
  sennae 110
  serpentariae 92
  thebaica 106
  Toluiferae balsami 111
  valerianae 116
  valerianae ammoniata 117
  veratri albi 112
  zingiberis 117

Page

Tinctura zinci acetatis ii. 354
Toluifera balsamum i. 418
Tormentilla erecta 291
Tragacantha gummi 485
Triticum hybernum 489
Trochisci carbonatis calcis ii. 385
    glycyrrhizae 386
        cum opio ib.
    gummosi 387
    nitratis potassae ib.
Turpethum minerale 335
Tutia praeparata i. 216, ii. 350

U

Ulmus campestris i. 384
Unguentum acetitis plumbi 400
    acidi nitrosi 399
    aeruginis 392
    cantharidis 391
    calaminaris 401
    cerae 390
    cerussae 399
    cetacei 390
    elemi compositum 404
    epispasticum fortius 391
        mitius 392
    hellebori albi 405
    hydrargyri i. 201, ii. 395
        praecipitati albi ii. 405
        nitrati 397
    infusi meloes vesicatorii 391
    nitratis hydrargri 397
    oxidi hydrargyri cinerei 396
    oxidi hydrargyri rubri 397
    oxidi plumbi albi 399
    oxidi zinci 402
    oxidi zinci impuri ib.
    picis 402
    piperis nigri 407
    pulveris meloes vesicatorii 391

Page

Unguentum resinae ii. 390
    resinosum ib.
    sabinae 406
    sambuci 404
    saturninum 400
    simplex 389
    spermatis ceti 390
    sub-acetitis cupri 392
    sulphuris 403
    super-nitratis hydrargyri 398
    sub-nitratis hydrargyri 397
    tutiae 402
    veratri 405
Uva ursa 293

V

Valeriana officinalis i. 185
Veratrum album 420
Vina ii. 79
Vinum aloes socotorinae 80
    amarum 81
    antimoniale i. 317, ii. 288
    ferri 304
    gentianae compositum 82
    ipecacuanhae ib.
    nicotianae tabaci ib.
    opii 85
    rhei palmati ib.
    tartritis antimonii i. 317, ii. 288
Vitriolum album i. 216, ii. 352
    coeruleum i. 217, 475
    viride i. 212, ii. 296
Vitrum antimonii ii. 267
    antimonii ceratum 268

Z

Zedoaria i. 261
Zincum 215, 279
Zinci carbonas ii. 349
    oxidum 350
    sulphas 352
    acetas 349
Zingiber i. 262, 426

FINIS.

KING'S COLLEGE